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A Study of the Maxillae with Regard to Their Blood and Lymph Supply.

III.

By JOHN BETHUNE STEIN, M.D.

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Professor of Physiology, Veterinary Department New York University.*

The tooth is an organ of the exoskeleton, in contradistinction to the alveolus, which is a part of the endoskeleton. The tooth is a differentiated portion of the oral mucous membrane, which in turn is a differentiated part of the skin. The skin is ectodermic and mesodermic (mesenchyma, Minot) in origin. The tooth is, therefore, originally an ossified papilla of the skin or mucous membrane.

The shape of the tooth seems to be determined by some mutual arrangement on the part of certain cells of the *enamel germ* or *organ* (germ cells, inner enamel cells,¹ ameloblasts) and the cells of the embryonal connective tissue beneath them (see Fig. 87). It is stated that the enamel organ was first described by Purkynje and his pupil Raschkow. The embryonal connective tissue immediately beneath the enamel organ (later to become the *tunica propria* of the mucous membrane of the mouth) becomes denser in structure, seems to force itself against the ameloblastic

¹ Schwann, Mikrosk. Untersuch. Berlin, 1839.



FIG. 87.

layer of the enamel organ, invaginates the same, and thereby forms the so-called *dentinal papilla*.

The enamel organ is a differentiated part of the epithelium of the oral mucous membrane (Marcusen,² Huxley,³ Kölliker,⁴ Natalis Guillot,⁵ Todd and Bowman,⁶ Robin and Magitot⁷; see Fig. 87), which in turn has

² Marcusen, Ueber die entwicklung der Zähne der Saugethiere, Bullet. de la Cl. phys.-math. de l'Acad. imper. de St. Petersburg, 1849.

³ Huxley, Quarterly Journ. of Microscop. Sc., 1854, 1855, 1857.

⁴ Kölliker, Die Entwicklung der Zahnsäckchen der Wiederkäuer, Zeitschr. f. wiss. Zool., 1863. Gewebelehre, 4 Aufl.

⁵ Natalis Guillot, Ann. des. sc. nat. (Zoologie), IV. Serie, 1858, T. IX.

⁶ Todd and Bowman, Physiological Anatomy, Vol. II.

⁷ Robin and Magitot, Jour. de la Physiol., Paris, 1860, T. III. et IV., 1861.

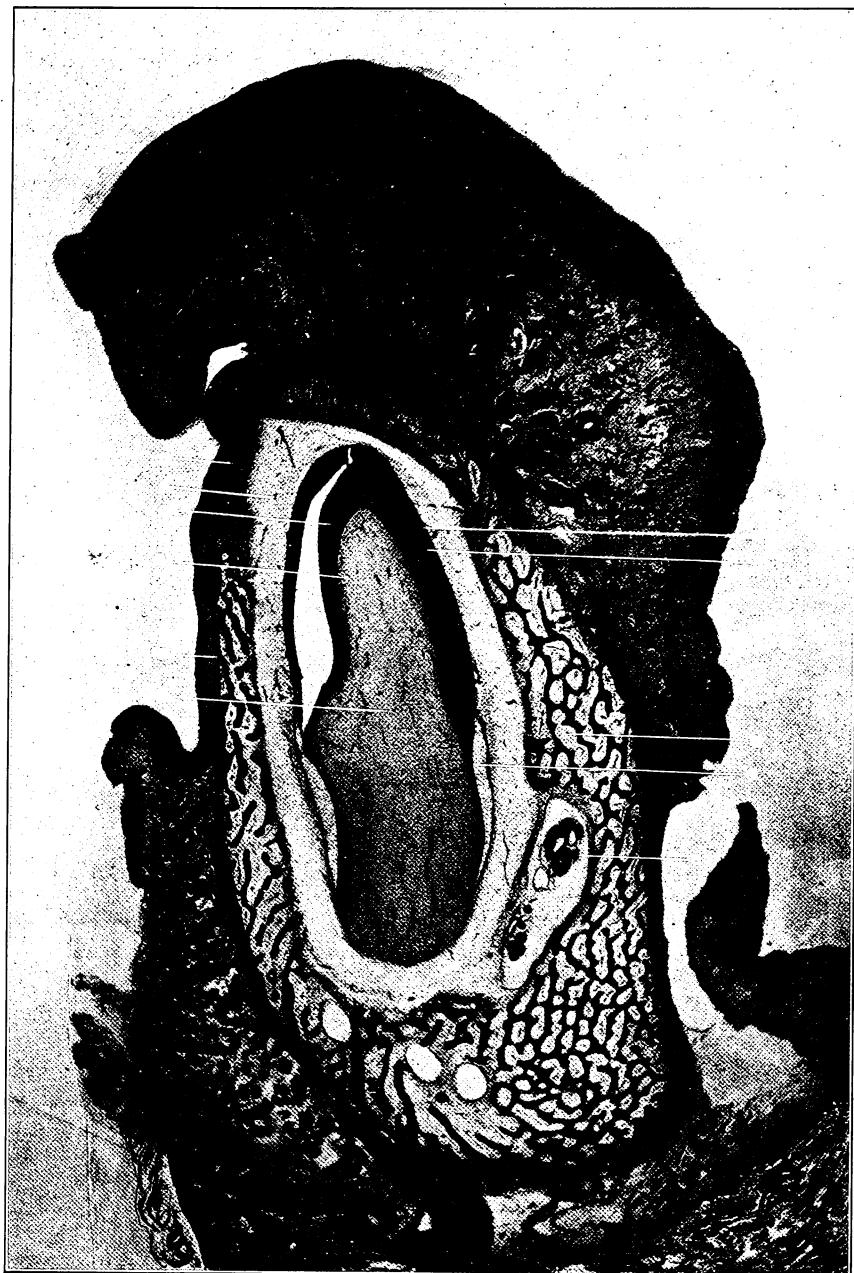


FIG. 88.

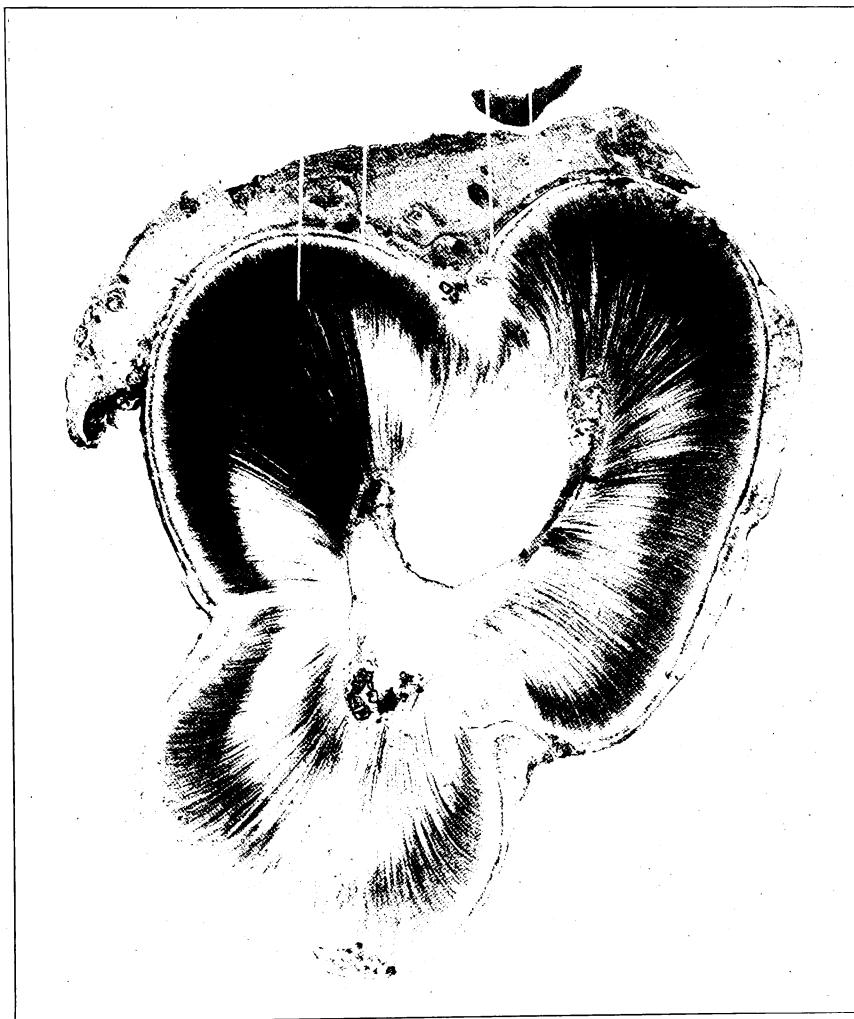


FIG. 89.

come from the ectoderm. The ameloblasts form the calcified epithelial cap (enamel) of the tooth. The dental (see Fig. 88) papilla seems to differentiate itself into *dentin*, and some undergo little or no differentiation, and we call it the *pulp*. As the juxtaposition of the tooth and alveolus obtains, the interlying part of embryonal connective tissue differentiates itself into the intra-alveolar periosteum, and also affords the investing

substance (cementum) to the tooth (see (7) Fig. 88). It is stated that it is the inner wall of the so-called tooth sac which forms the cementum in the same manner as periosteal bone is formed. The final position of the tooth and alveolus appears to be determined by some subtle reciprocal activity, or some law, which governs construction, synchronous with growth and development, in the anlage of the tooth and the anlage of the maxillary bone, of which the contrasting alveolus will later form a part.

In Fig. 87 we have presented a vertical section of the head of a fetal pig. Two teeth are forming, and the mandible is beginning to form. (1) is the anlage of a superior molar tooth; the anlage of the superior maxilla has not yet appeared. The structures seen above this anlage are blood vessels and nerves. (2) is the anlage of an inferior molar tooth. The dental ridge, groove, papilla, and enamel organ, are seen.

In (3) we see the anlage of the mandible; note the osteoblasts and the newly formed bone (intra-membranous bone formation). Number (4) is a section of the tongue, and (5) a section of Meckel's cartilage. Blood vessels are seen in the lower left, upper and lower right quadrants of the specimen.

By right of structure all the tooth, except the epithelial portion (enamel), is entitled to a periosteum; for it is bone. The dentin, or *zahnbein gewebe*, as the Germans call it, is similar to bone in its ultimate structure, and is the same in structure as the bone of vertebrate fishes,⁸ which however is vascular. The cementum is bone. Dentin and cementum have a periosteum; the former has the pulp, which is an undifferentiated one; the latter has the intra-alveolar periosteum, or what we might call the periosteum of the tooth. The two are continuous at the *foramen apicis dentis*.

We study in Fig. 88 a longitudinal section of the jaw of a fetal pig, showing the development of the mandible and tooth.

At (1) is seen the regular row of columnar cells, the ameloblasts; beneath them at (2) we observe a layer of young enamel. Above the ameloblasts we can barely decipher the *stratum intermedium* of the enamel organ. At (3) we have the trabeculae of the new forming bone. The tissue within the cancellous spaces is embryonal connective tissue. No marrow has as yet formed. A part of the enamel organ (stellate recticulum) is seen at (4). In the corresponding locality, on the opposite side of the developing tooth, we also see a remnant of the stellate recticulum. (5) shows us the place where the inferior dental artery, nerve, and vein, are situated, and the fact that the mandibular canal has not been roofed in and the floor of the alveolus not formed is also shown.

⁸ Kölliker, Über verschiedene Typen in der mikrosk. Structur des Skellets der Knochenfische. Würzburger v. hdlg., 1859, IX.



At (6) we have the mucous membrane of the gum fairly well differentiated, although between it and the enamel cells (1) there is a considerable amount of embryonal connective tissue (7) which surrounds the developing tooth and separates it from the new forming bone. This tissue (7) will later form the intra-alveolar periosteum and cementum. To the left of (6) we see the dentinal ridge and groove, and to the right of (6), in the upper part of (7), the secondary enamel germ. Number (8) is the forming dentin, and (9) the odontoblasts which are forming dentin, much in the same manner as the osteoblasts are forming the young bone. If we examined the tissue at (3) with a higher-power lense, the osteoblasts would become evident. The osteoblasts are to be seen forming the bone at (3), Fig. 87. Starting from (10), and passing down and around the developing mandible, we observe a fairly well marked line; this is the young periosteum. Above, at the point where the bone is absent and the tooth will erupt, you will note that the mucous membrane is continuous with (7), the embryonal connective tissue. (X) is the dentinal papilla, (A) is an artefact; the enamel cells with the young enamel have been torn off from the underlying dentin, and this space has been formed. The part of tissue above and to the right of the developing mandible is the outside of the jaw and lip. The tissue at the lower left side of the specimen is a developing salivary gland. The continuity of the epithelium, from the upper part of this gland to the muco-cutaneous junction on the lips, is obvious.

We should make further note that the embryonal connective tissue (1) outside the forming bone (young periosteum), (2) in the deeper layers of the young mucous membrane near the crown of the developing tooth, (3) in the meshes of the new forming bone, (4) surrounding the tooth, (5) in the dentinal papilla, are continuous and vascular. In this specimen a considerable degree of differentiation has taken place in the anlage of the tooth and the mandible; growth succeeded by development has gone on *pari passu* in both the tooth and mandible. The chemical relationship of bone and dentin is expressed in the micro-chemical reaction which takes place in these tissues, for this specimen was stained with picric-acid fuchsin (Van Giesen), which stains the odontoblasts and osteoblasts yellow and the young dentin and bone red.

We have traversed very hurriedly some delicate ground, which we leave with Professor O. Hertwig's remark: "Their (the teeth) development in man and in animals is accompanied in a manner which is neither simple nor easily intelligible"; also that of Professor Minot: "It must be remembered that most of the articles upon the human teeth are by more or less incompetent writers." These two statements offer a field to the trained and earnest investigator.

The intra-alveolar periosteum closely unites the tooth and alveolus; the union strengthens each and grants them both a greater effectiveness of function. The co-ordination in the growth and development of the alveolus and tooth increases still further this intimate relationship. The latter fact is borne out by clinical experience, in that it is extremely difficult, if not impossible, to extract a tooth, without doing a great deal of damage to the alveolus and frequently to the tooth.

Fig. 89 shows us a transverse section of a tooth with a part of its adjoining alveolus. A thin section was made of this specimen; nevertheless, the alveolus, intra-alveolar periosteum, and tooth, all cling together. It may possibly be an osseous union between the cementum and bone which holds them, or, what is more probable, a peculiar coaptation on the part of their contiguous surfaces. Number (1) points to the dentin: (2) to Purkynje's or Tomes's granular layer; (3) cementum; (4) intra-alveolar periosteum; (5) the fractured alveolus still clinging to the tooth.

Fig. 90 gives us two teeth from an ox, one of which (at right in picture) could only be extracted after part of the alveolus was cut away; the other when extracted fractured, and a part was left in the alveolus. (Note fractured distal root.) The fractured piece is seen in an alveolus in Fig. 91. (Fig. 91 is the reverse side of Fig. 5.) In order to extract the larger tooth (the one at the right in Fig. 90), it was necessary to cut away part of the internal alveolar wall of the two terminal alveoli (at the left in Fig. 91). The fourth and fifth alveoli from the left in Fig. 91 show markedly cribriform floors, the foramina of which opened directly into the mandibular canal (see Fig. 5, about the middle of the specimen). Observe the contour of the roots of these teeth in Fig. 90, and how they must have been, we might say, almost molded into their proper alveoli.

The three foregoing specimens (89, 90, 91) have been shown in order that we might see how reciprocity is expressed in the final development, on the part of the exoskeleton and endoskeleton, and how intimate is the kinship, especially in their ultimate position.

If one compares Fig. 91, at the point where the fractured apex of a tooth remains within an alveolus, with the corresponding point on the reverse side of Fig. 5, it can be noted that the fine, cancellous bone remains in this region intact; whereas, in other regions it was washed away in the preparation of the specimen. May not the intact condition of this fine cancellous bone, in this particular region, be due in no small measure to the presence of the apex of the tooth in the alveolus above it, protecting the floor of the alveolus and little or no injury having been inflicted thereupon?

Fig. 90 is especially worthy of note, for, at the apices of the four

ITEMS OF INTEREST

roots we see only one foramen, and even the fractured root seems to possess no opening. Numerous foramina can, however, be seen at different points, both at and near the apices of these roots. These teeth express in a multiform way what is to be found in the teeth of man.

Let us break up this amalgamation between tooth and alveolus. Let



FIG. 90.



FIG. 91.

us knock off from the specimen in Fig. 92 the cap of calcified epithelium; for this tissue is said to be dead⁹; no metabolism takes place within it, no nourishment is necessary for it. Let us lay aside the enamel cap, as we have in Fig. 93, and direct our attention to the hard connective tissue portion of the tooth; examine it in the same manner as we have the bone; reserving the soft parts for future scrutiny.

At the apex of the root of a tooth we can see a canal opening by a single aperture (*foramen apicis dentis*) (see Fig. 94). Raschkow and Havers (the latter the discoverer of the Haversian canal) have described

⁹ Sobotta, Histologie, München, 1905.

this canal as opening (more rarely) by a double aperture. The specimen in Fig. 94 was decalcified and the tip of each root cut off, which showed on very careful examination only one foramen for each root prior to the decalcification, but on microscopic examination, the root to the left, in Fig. 94, disclosed no less than four openings, three of which are to be



FIG. 92.

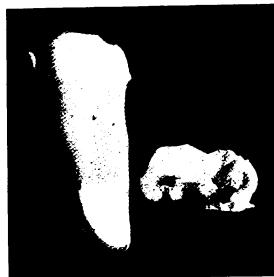


FIG. 93.

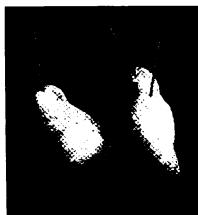


FIG. 94.

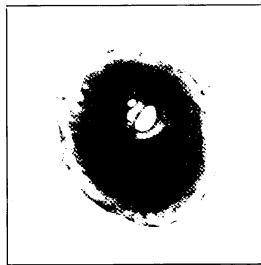


FIG. 95.

seen in Fig. 95. This specimen came from the third root examined. We have obtained other specimens showing the same condition. It would be interesting and valuable to know how often the pulp canal opens by more than a single foramen.

Dentin (*substantia ciburnea*) is the analogue of bone. In fresh, thin sections it is yellow white, translucent or transparent. It is highly elastic, and friable. The place where it has been fractured presents a finely fibrous and lustrous surface. When dried, the sections have a silky or satiny appearance, due to the entrance of air into the system of canals

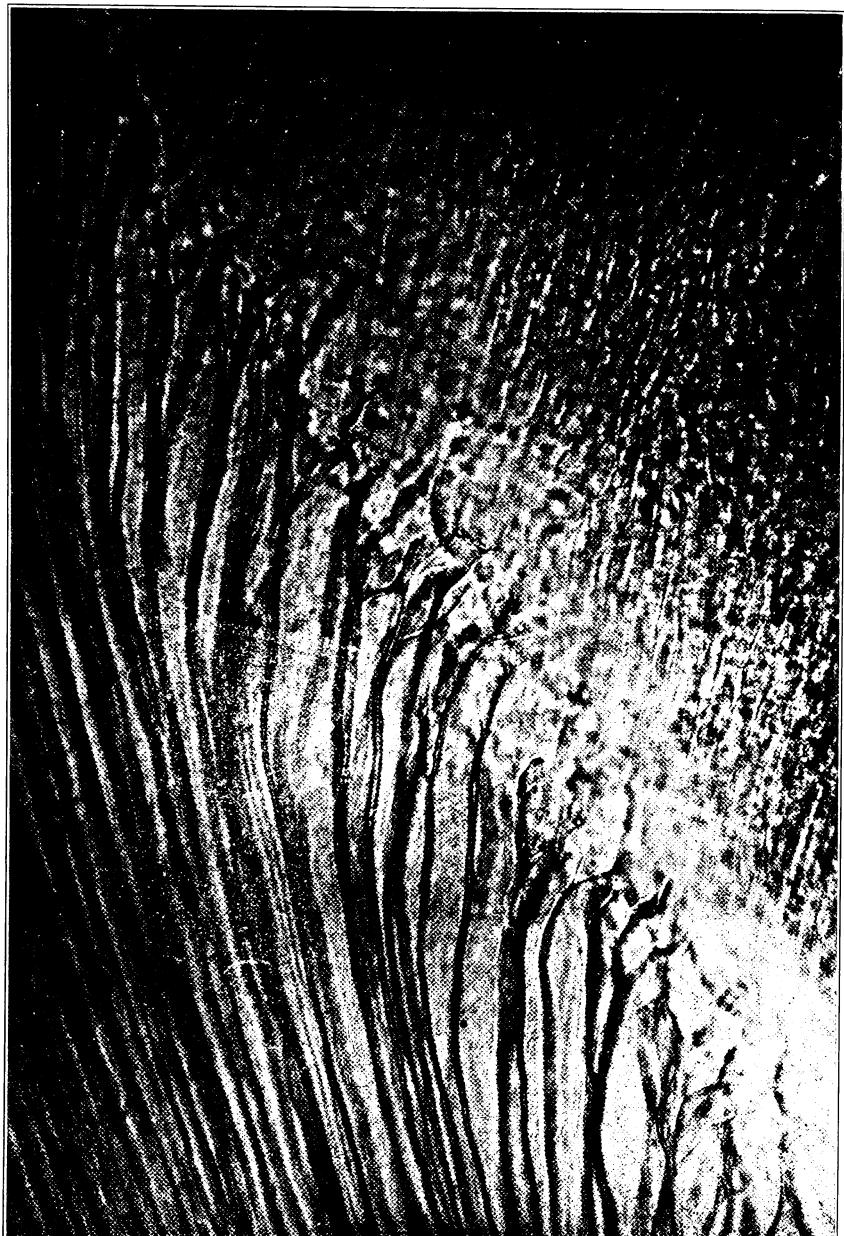


FIG. 96.



FIG. 97.

which are found within it. We have stated that in its ultimate structure it resembles bone, for the ground substance is made up of fibrillæ which are either calcified or the mineral salts are deposited in the ground substance.

It is said that the organic basis of the dentin, like that of bone, may be readily obtained by treating the tooth with hydrochloric acid. The organic basis is said to be of a firmer consistency than bone. After this treatment, the form of the tooth persists, except the enamel, which has been dissolved, but it is difficult to see the dentinal tubules. This organic basis yields gelatin on boiling. If we macerate the dentin in acid or alkalies until it is quite soft the matrix after a time dissolves, but the dentinal tubules with their walls offer a greater resistance to the macerat-

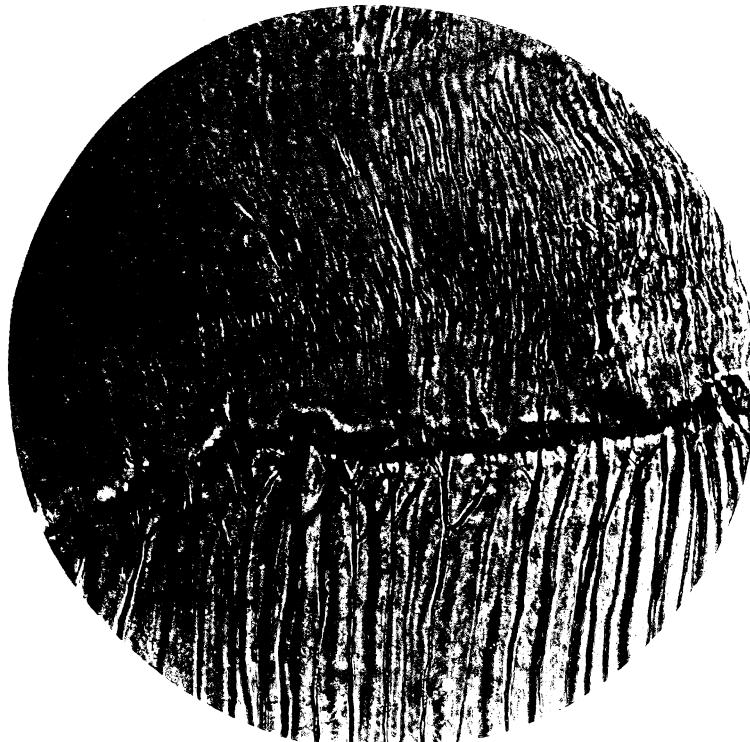


FIG. 98.

ing fluid, and thus can be readily isolated.¹⁰ Prolonged maceration, however, dissolves the whole structure. After incineration the form of the tooth still persists; it is maintained by the integrity of the inorganic part.

The fibrils are in bundles, which in the root of the tooth run parallel with the long axis of the tooth and in the crown at right angles to the dentinal tubules (von Ebner).¹¹ The fibrils, as in bone, are probably held together by an inter-fibrillar cement substance, and the bundles of fibers by an inter-fascicular cement substance. There are no lamellæ. The ground substance appears homogeneous, which is probably due to the fact that the fibrils run parallel to each other, and not as they do in bone. In bone the lamellated appearance is due to the direction of the course of the fibrillæ in a given lamella. In bone, adjacent lamellæ have

¹⁰ Kölliker, Mikr. Anat., Vol. II.

¹¹ von Ebner, Histologie mit Einschluss der Histogenese, in Handb. Zahnheilkunde von J. Scheff, Jr., Bd. I., Wien.



FIG. 99.

the fiber bundles of one lamella lying at more or less right angles to those of another, which gives rise to optical differences in the structure, when it is viewed by transmitted light. (See Fig. 10.)

Neither blood vessels nor nerves, so far as I know, have been found in the dentin of the human tooth. Regarding the possible presence of canals resembling Haversian canals in dentin of the human tooth we shall speak later. The chief difference between dentin and bone is the absence of cells within the former.

Numerous tubules, dentinal tubules or canaliculi (these tubules were first seen by Leeuwenhoek¹²) run radially from the pulp surface of the dentin toward the enamel (see Figs. 96, 97, 98) and cementum (see Figs.

¹² Leeuwenhoek, *Philos. Transact.*, 1678, opera omnia Lugd. Batav., 1722, T. I.

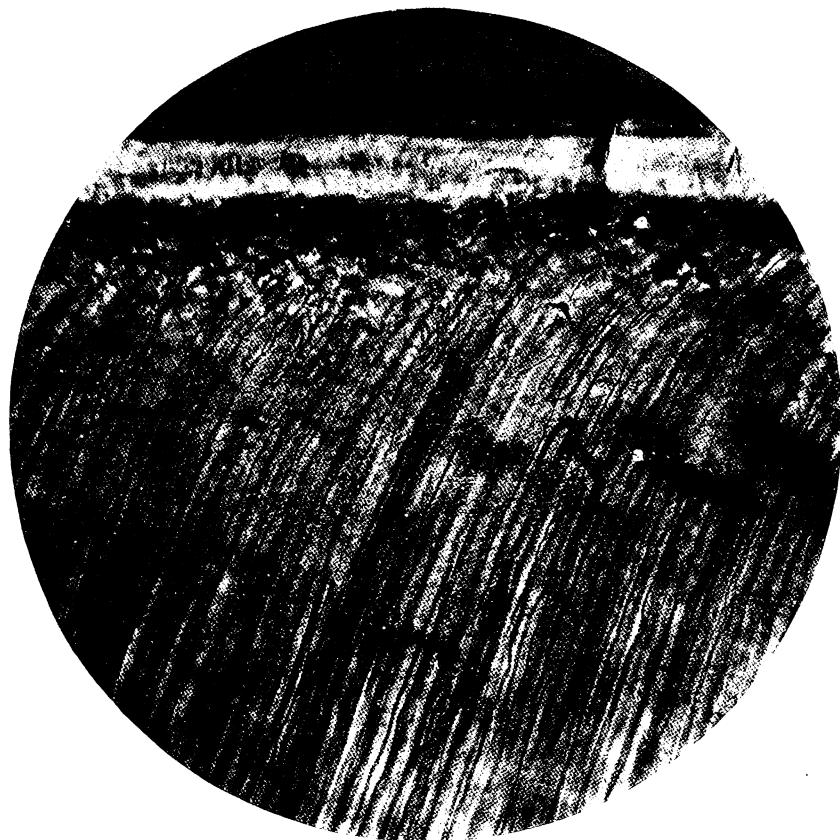


FIG. 100.

99, 100). The tubules passing toward the enamel take a more or less straight course, while those toward the cementum take a sinuous one. The tubule itself presents numerous slight curves or zigzags (Retzius¹³), and makes, according to Welcker,¹⁴ numerous spiral turns in its course. The tubules also present numerous ramifications. The canaliculi measure in diameter at: (1) the pulp surface of the dentin, 4 to 5 microns; (2) their terminations, .5 micron; (3) their side branches, .3 to .6 micron. At or near where the dentin and enamel meet the dentinal tubules usually fork and end blindly in the dentin; others end blindly in the inter-prismatic substance of the enamel; still others appear to end within the enamel in

¹³ Retzius, *Bemerkungen über den innern Bau der Zähnen* *Mull. arch.*, 1837.

¹⁴ Welcker, *Bemerkungen zur Mikrographie* *Zischr. f. rat. Med. N. Folge*, Band VIII.

blind elongated oval or spindle-shaped dilatations. (See Figs. 97 and 98.)

Whether or not the dentinal tubules actually penetrate the enamel can not be stated with any sufficient degree of certainty. It must be remembered that it is not easy to obtain sections the surfaces of which are absolutely parallel, and that fissures in the enamel and inequalities in the adjacent surfaces of the enamel and dentin are liable to lead one to false conclusions.

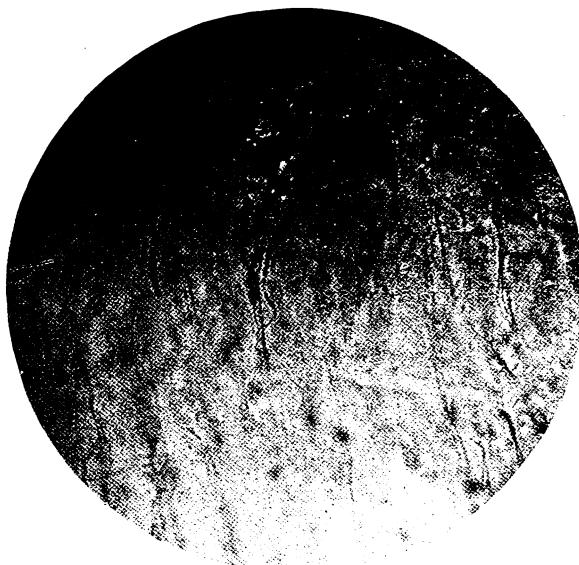


FIG. 101.

Waldeyer¹⁵ and Hertz¹⁶ have not convinced themselves that the tubules penetrated the enamel. Tomes¹⁷ and Kölliker¹⁸ however are strongly of the opinion that "some tubules, with their soft contents," do enter the enamel. The latter two observers think this is especially so among rodents and marsupials. Waldeyer has searched for these tubules in the enamel of young teeth in the process of development, but never found the tubules penetrating the enamel. The writer has tried again

¹⁵ Waldeyer, Human and Comparative Histology (Stricker), Vol. I.

¹⁶ Hertz, Untersuchungen über den feineren Bau und die Entwicklung der Zähne, Virch. Arch., 1866, Bd. XXXVII.

¹⁷ Tomes, A Course of Lectures on Dental Physiology and Surgery, London, 1848. London Phil. Transact., 1849, Marsupials; ib., 1850, Rodents.

¹⁸ Kölliker, Gewebelehre, 5 Aufl., 1868.



FIG. 102.

and again to find the tubules in young enamel, but has not been able to discover any.

Our two photomicrographs (Figs. 97 and 98) give us two phases of the same specimen, taken in about the same locality. What is the center of the field in Fig. 98 is a little toward the left in Fig. 97. A is the enamel, B is dentin, and the line where dentin and enamel meet is obvious. Note that the focus is not the same in these two pictures; characteristics which are present in 97 are more or less absent in 98. There are in Fig. 97 nine distinct places where the dentinal tubules penetrate the enamel. In many cases the plane of section of the tubule is in its direct longitudinal axis, both in the dentin and enamel. Eight tubules (some of these eight are seen in Fig. 97) appear to enter the enamel in Fig. 98.

EXCLUSIVE CONTRIBUTIONS

Fig. 97 was taken at least two weeks after Fig. 98, and during this interval many frequent studies were made of the specimen and photographs taken in order to determine what was the real picture. For that reason we present them both, and they seem to prove, as well as a photograph can, the actual penetration of the enamel by the dentinal tubules. In Fig. 97 a fissure (to the left) in the enamel can be seen. Figs. 97 and 98 were taken with the same lense (Leitz objective 7 and a Zeiss



FIG. 103.

compensating ocular). In Fig. 97 the bellows was pulled back, hence the enlargement.

At or near the junction of the cementum and dentin the dentinal tubules either fork and end blindly in the dentin or terminate in one of the spaces of Purkynje's or Tomes's granular layer (Figs. 99, 100, 101, 102), or one of their terminal branches anastomoses with that of another, forming a loop, the so-called terminal loop of the dentinal canaliculi (Fig. 102), or they open into one of the interglobular spaces (Figs. 100, 102, 103, 104).

Side branches are given off from the tubules (Figs. 99, 100), which



FIG. 104.

are greater in number in the outer zone of the dentin than in the zone nearer the pulp. The former branches leave the tubules at a more acute angle than the latter. Some of the side branches of one tubule frequently anastomose with those of a neighboring tubule. The dentinal tubules near the lower third of the tooth not infrequently divide into two at a short distance from their origin. (Fig. 105.)

Fig. 99 is a section of dentin taken from about the middle third of the dentin portion of the tooth. (1) is part of the cementum; (2) the granular layer of Tomes, and (3) the dentin, with the tubules and their side ramifications. Some of the tubules end in the dentin; most, however, terminate in the granular layer. In Fig. 100 the numerals 1, 2 and

3 indicate the same structures as in Fig. 99. This specimen was taken from immediately below the place where the cementum and enamel meet. On either side (3) is seen a small interglobular space, with tubules terminating in it. Other smaller spaces can also be seen in the dentin. The side branches and their anastomosing can be easily observed. A picture

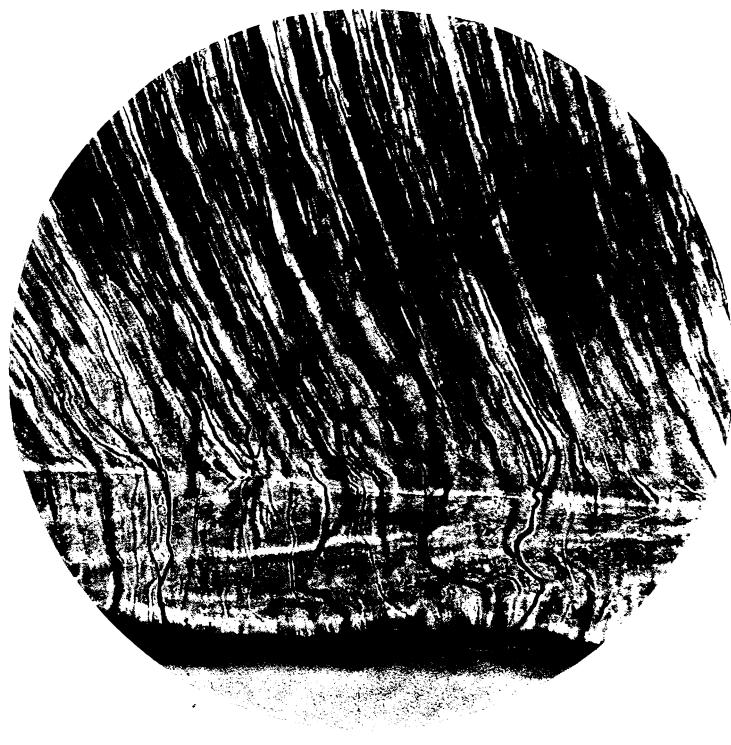


FIG. 105.

taken with a lense of higher power shows us, in Fig. 101, a dentinal tubule forking and each branch entering a space in the granular layer. In Fig. 102 we see another specimen of dentin, taken from the upper part of the middle third of this structure. In the center the terminal loops are seen, and in the lower right quadrant of the field numerous dentinal tubules enter an interglobular space. Two smaller interglobular spaces are to be found in the left half of the field.

A small interglobular space, highly magnified, is seen in Fig. 103.



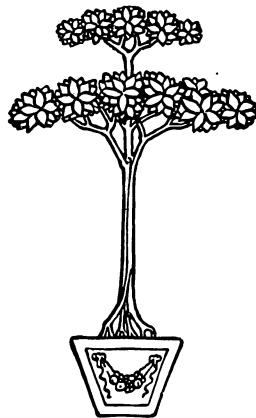
ITEMS OF INTEREST

The tubule terminates in four branches, one of which becomes greatly dilated and enters a small interglobular space.

Fig. 104 shows an interglobular space, somewhat resembling a crown photographed in profile. The clear space with the crown is the dentinal globule of Kölliker; dentinal tubules could be seen passing through the dentinal globule, which could not be shown in the picture as we have taken it. Some of the tubules terminate in the space, the others penetrate it. All these spaces contained air, and appear black by transmitted light.

The preparation and the taking of photomicrographs of the above specimens was done at the laboratory of Physiology and Histology of the New York College of Dentistry. I am indebted to Mr. John L. Peters for his assistance in this work.

(To be continued.)





The Angle Splint.

By V. P. BLAIR, M.D.

*Professor of Oral Surgery, Washington University, Dental Dept.,
St. Louis, Mo.*

I was interested in the report of a case of mandibular resection that appeared in the ITEMS OF INTEREST for June, 1908. This kind of surgery is still very young, and every such contribution is a substantial addition to the literature. Therefore I do not believe that a discussion of certain points is out of place. The operation was cleverly done, and the result is the natural sequence. What I wish to discuss is the Angle splint, which incidentally Dr. Ballin has condemned on the same grounds as I did some years ago, when Dr. Angle first proposed this splint before the Society of Dental Science of St. Louis as a substitute for the cruder method of depending entirely upon wires, which I was then still using in these operations. This was some time before the splint was published in 1903.

As Dr. Ballin rightly says, the splint in the exact form that Dr. Angle proposed it is rather impractical, but the principle of a three (not five) piece splint, as far as I can determine original with Dr. Angle, is not only logical, but when properly modified, extremely useful. A Dr. Hullihan, of West Virginia, in about 1848, employed a continuous one-piece dental splint in a case of partial resection of the jaw, and this is, as far as I know, the earliest report of the use of a dental splint for this purpose.

Fig. 1 shows a splint of the three-piece type, which we have lately removed from a patient, applied over the original plaster cast, with all of the teeth in place. It is of German silver, and was made for me by Dr. James Brown, D.D.S., of this city, to whose ingenuity, patience and skill I am greatly indebted for a number of successful splints and contrivances for these cases.

To use this splint a cast of the jaw is sawed in such a way as to counterfeit the result desired, and the three pieces of the splint are made.

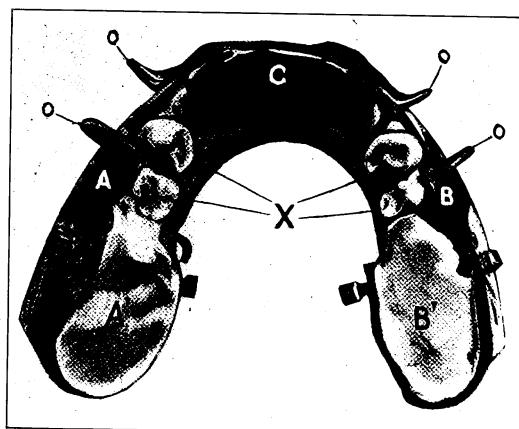


FIG. 1.

Instead of (as Dr. Angle suggested) the ends of the splint being used as guides for the saw, they are made shorter than the proposed jaw fragments so as not to interfere with the field of operation. In the case illustrated the first bicuspid on each side was removed. The flanges (O, O), which are of goodly size and each having two corresponding oval holes, are soldered in place. Around the upper edge of each of the back pieces A and B, is soldered a low fence, and the occlusal surfaces are covered with gutta percha stopping (A' and B').

At a previous date the teeth to be sacrificed have been removed and the cavity has healed. The day before the operation the three sections of the splint are applied. In the case upon which this particular splint was used, the teeth were so short that we had to supplement the cement with screw points applied to the necks of the teeth in appropriate places. Some of these screws can be seen in the illustrations. The essential points of this splint are that it shall fit the teeth with sufficient accuracy to stay

in place, and, second, that when the section of bone is removed and the new jaw is constructed, the flanges be not in contact. Herein is the provision for allowing for inaccuracy in sawing. The spaces between the flanges are now filled with washers made from lead plate, a number of which, of the probable sizes needed, have been previously prepared. The lead plates in place, bolts with slotted or square heads, with long threads, are passed through the holes in the flanges and lead plates. Accurately fitting nuts are applied and the sections of splint drawn together. The

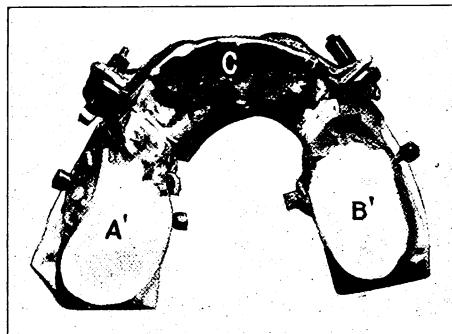


FIG. 2.

holes in the flanges are oval, and the long vertical diameter allows of adjustment. As seen in Fig. 3 (D) it is not even necessary that the flanges lie parallel in the final adjustment.

There are many little details which each operator will work out to suit himself, but there is one suggested by Dr. Brown that is too useful to omit here. To facilitate the uniting of the splint sections at the time of operation, he solders a piece of wire to each lead washer and to each nut so that they can be conveniently held in place while adjustment is being effected. The wires are later clipped off.

The continuous dental splint used by Hullihan would assure accurate adjustment and retention without confining the lower jaw. The sectional splint, while it conserves this object, has three other distinct and radical advantages. First, it can be applied previous to the operation. Second, it allows of adjustment to compensate for slight inaccuracy of the bone cuts, and finally the strength of the union may be tested at any time without removing the splint. The inaccuracies in sawing should not be great, and we plan these operations with a definite subsequent orthodontic procedure in view. Whether one retains the inferior wire to

unite the bone fragments directly, will depend on circumstances. It does no harm in itself, and I feel safer with it. We put the gutta percha on the occlusal surfaces so that the patient will at once find an easy, comfortable occlusion for the molars. After adjustment we cover the flanges with gutta percha to protect the lips and cheeks.

To perform this operation without cutting through the mucous membrane, other things being equal, is a distinct advantage, but I think that Dr. Ballin over-estimated the gravity of opening into the mouth.

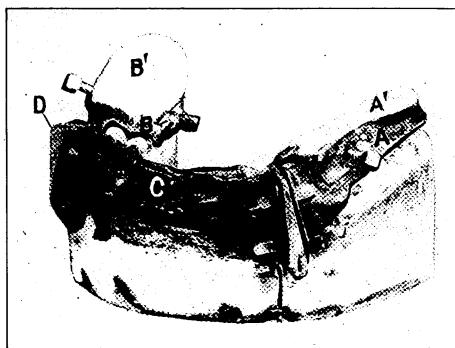


FIG. 3.

While it is certainly to be avoided, if possible, and a quicker and safer result will be obtained when infection of the wound is avoided, still such an accidental or deliberate procedure is not necessarily fatal to a good result.

Fractures of the body of the mandible are nearly always compound, and in doing resections for various jaw deformities, protrusion, retraction and downward bending, I can recall having opened into the mouth in thirteen of the bone incisions without in any case prejudicing the final result.

See "Operations on Jaw Bone and Face," *Surgery, Gynecology and Obstetrics*, January, 1907. Also *Dental Era*, April, 1907. Also Arbuthnot Lane, "Cleft Palate and Hare Lip," 1905, page 11.

In no sense is any of this meant as a criticism of Dr. Ballin's case. There can be no question of the fact that he has good reason to be proud of his operation and his result. It is simply a discussion of points in technique.

SOCIETY PAPERS



Root Radiography.

By M. L. RHEIN, D.D.S., M.D., New York.

A lecture before the New Jersey State Dental Society, July, 1908.

Seventy years ago, when American dentistry started on its record-making career, there was practically no attention paid to root canal work or abscesses of the periodental tissue. The only relief given by dentists to such conditions was by means of the extracting forceps. In those days everything the dentist was called upon to do was practically exposed to the eye, consequently dentistry, distinctive from every other division of medicine, was at that time practically an exact science. This was the great attraction that drew to it so many superior minds, who could afford almost to sneer at the frequent errors made in diagnosis by practitioners of other specialties. The truth was that the art of differential diagnosis was unnecessary to the dentist of that period, because everything which he did lay exposed to his eye. During the rapid development of American dentistry, attention soon was brought to the important question of pulp devitalization and subsequent treatment of root canals. This was followed by attempts to save teeth suffering from alveolar abscess, and more or less attention was given to the possibility of treating pathological conditions of the tissues surrounding the roots of the teeth. These diseased areas were not in sight, and while the practice of dentistry was gaining ground from an evolutionary standpoint, it lost its reputation as being an exact art. It became necessary for the dentist, like every other practitioner of medicine, to be able to make a correct differential diagnosis in order to prove himself competent. The lack of this ability among the mass of our dentists is the greatest

criticism to be made against dental education at the present time. The result of the lack of proper teaching and training in this direction is only apparent to careful observers. *The most beautifully performed dental operations are no compensation for mistakes in diagnosis.*

About twelve years ago there was introduced into the scientific world the discovery of Roentgen. Since then the X rays have been a most valuable adjunct in dentistry. While alone they can never be depended upon for making a correct diagnosis of the diseases of the periodental tissues, their aid is invaluable and very frequently the only means of

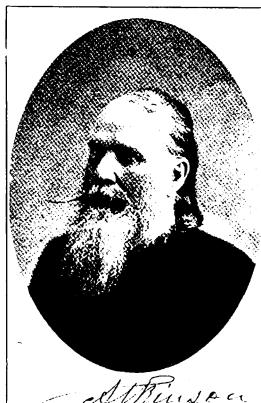


FIG. I.

clearing up obscure cases. Where the X rays are intelligently used, they have almost succeeded in restoring the practice of dentistry to the plane of an exact science.

It is not my purpose to dwell upon the X ray nor the method of taking radiographs, because the technique can be very easily learned; the difficulty is to properly interpret the radiograph. It must always be borne in mind that these are not photographs, but shadow pictures, and that the depth of the shadow depends entirely upon the thickness and quality of the tissue penetrated by the X ray. The degree of differentiation of tissues disclosed in the radiograph depends upon the length of the exposure and upon the strength of the rays. There are many other facts that must be taken into consideration in order to obtain a correct interpretation of the picture. The position and the distance of the tube from the object are important; all these things have a bearing on the distortions in certain portions of the object which are

frequently noted. This question of the distortion in the radiograph is an important one, because it is very often uncertain whether the peculiar condition disclosed is a distortion, or, as frequently happens, a malformation. While the radiograph has been of great value in many departments of dentistry, we will confine ourselves this evening entirely to its diagnostic aid in pulp technique and in pathological conditions in the periodental region.

The pictures shown to-night represent cases taken from my own practice, from that of Dr. M. I. Schamberg, and of Dr. Richard Blum,



FIG. 2.

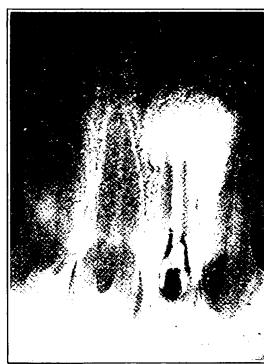


FIG. 3.



FIG. 4.

of New York. My object in stating this is to impress upon you the fact that they have not been prepared especially for this lecture, but have been used for diagnostic purposes.

The first picture that I shall show you is not a radiograph, it is a copy of the choicest photograph in my collection. The portrait of the greatest dental diagnostician of his time, a man who was known and loved by all the older members of this society, and before I show you the other pictures I will respectfully ask that the audience rise for a moment to do honor to the memory of Dr. William H. Atkinson.

(At this point the photograph of Dr. William H. Atkinson was thrown upon the screen, and the audience arose and remained standing for a few seconds.)

As was so well said by Dr. Flint this morning,
Fig. 2. it is necessary to know and understand normal conditions before observing or studying the abnormal, and in discussing radiographs it is always valuable to show normal

ITEMS OF INTEREST

alveolar structure before pathologic conditions are displayed. I have selected this picture (Fig. 2) for this purpose, and it also has a very interesting clinical feature, which is very likely apparent to the audience. What I want to first impress upon you is that this is the appearance of normal tissue around the alveolar socket. You see the film of osseous matter without a break at any point where the roots are involved. This is an interesting pathologic specimen, inasmuch as it is the picture of a boy at the age of ten who, in falling about two years before broke off the top of the central incisor. A temporary tip was placed on the incisor



FIG. 5.



FIG. 6.

for the purpose of preventing elongation or rotation of the incisor during adolescence, and the radiograph was taken about two months ago in order to determine whether there was any trouble in the pulp of that tooth, and to my astonishment I found that while the pulp of the tooth is healthy, there is a supernumerary tooth lying between the two centrals. What to do with it is a question to be considered in the future.

This is a picture showing how the ordinary alveolar abscess affects bone. You see in this picture a condition that is very often found, a loss of the end of the root, and the light space is the lost tissue, practically an empty space as far as physiologic tissue is concerned.

I will show you a number of these pictures now in order to illustrate the different appearances that alveolar abscesses make in radiographs.

Fig. 4. On the negative from which these lantern slides are made, the abscess area, instead of showing light, as seen here, will show black. This is another picture showing an abscess which involved both of the incisors.

Fig. 5.

This is an interesting case of an abscess tract. It was taken for orthodontic purposes. We have here a deciduous cuspid, and the picture was taken

in order to find out whether there was a permanent tooth in position, and we had disclosed to us just that kind of a surprise that we frequently get; information that we have no idea of obtaining is suddenly brought to our attention concerning conditions in the jaw itself. Above the deciduous tooth is an abscess tract, and there is no appearance of the permanent cuspid.

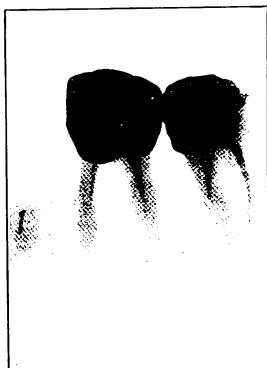


FIG. 7.



FIG. 8.

Fig. 6.

This is a picture of two abscessed upper bicuspids. You see the attempt made to fill the root canal of these teeth, and I have no doubt the operator

thought he had succeeded very well, but his success has been so far from perfect as to leave sufficient pabulum for infection to occur and produce a subsequent abscess, which is shown very plainly. The light space shows very distinctly the destruction of the tissue, and in the first bicuspid we have the root filling extending almost to the end, but not quite. Consequently, the organic matter not having been removed and the canal not being aseptically filled, opportunity was afforded for subsequent disease, though not so extensive as in the second bicuspid.

Fig. 7.

This is another case that has a very interesting clinical history, and only the history of these cases will make them as instructive as I would like to have them. It has been a lesson to me on the lack of patience of dentists in regard to this question of root technique, and the necessity of giving

sufficient time to reach the end of every root, if possible. Be sure you have made every attempt to go to the end of every root canal before you decide that it is impossible to go any further.

This patient, a lady of about fifty, presented herself in my office some years ago suffering from pulp nodules in both of these molars, and I did at that time what I do not do at present; I devitalized one tooth by an arsenical application, and was then called out of town. My assistant saw the patient and told her it was unnecessary to wait for me to return, that he could attend to the tooth just as well as I, and when



FIG. 9.

I came back he told me he had "fixed the patient up all right." He had given her one treatment and filled the root canal, and then had crowned the tooth. Subsequently I removed the pulp from the second molar in the same manner. According to my notes I gave these root canals five consecutive sittings, using sodium and potassium to see how far I could penetrate down the solid portion of this mesial root, and you see how far I reached.

Fig. 8. This is another picture showing imperfect root filling and the result thereof, as well as the irritation produced by a cap.

Fig. 9. The interpretation of a radiograph, as I said before, is not an easy matter, nor can we always make an absolutely correct diagnosis. This is a radiograph of a gentleman about seventy years of age, who was placed in my hands by another dentist on account of the pyorrheal condition of his mouth. A great deal of pus exuded from almost every socket in his mouth, but he was especially suffering great pain in the region of the first lower molar. The radiograph showed something which at first

sight appeared like a very large alveolar abscess, and I was almost certain that there was a dead pulp in that molar. I call your attention to one fact about the mesial root which should have made that diagnosis uncertain, and that is the exostosis of the root itself. On entering that pulp chamber I found the pulp not only alive, but in a most highly sensitive condition, so that it was with extreme difficulty that cocaineization was produced. Instead of its being an alveolar abscess it was a peridental abscess as described by Kirke a number of years ago in the *Cosmos*.



FIG. 10.



FIG. 11.

Gold Caps Without Pulp Removal.

I will now show you a few pictures of teeth that have been capped with gold-shell crowns without the removal of the pulps. Fig. 10 may give the impression that the crown did not fit well, but that is misleading. The crown had been extended from one molar to the bicuspid in order to span the gap caused by the lost tooth, and that accounts for this peculiar appearance. The mistake made in this case was in not removing the pulp, because the irritation resulting from an operation of that kind had the usual effect; the pulp died and an abscess developed.

Fig. 10.

This represents perhaps more fully the typical form of gold cap, as we see it almost every day, placed where it should never be placed; placed frequently where a simple filling or at least an inlay would serve better. We see here necrosis, as an effect of the abscess on the mesial root. This picture shows beautifully the destruction of a large mass of bone and a part of the root itself by necrosis.

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Fig. 12.

Here we have another gold crown, and I do not know just what the conditions of these roots are except as I can judge them from the radiograph. This is from the mouth of a lady where I made radiographs all around her mouth, but some parts I have not reached yet as far as operative work is concerned. I am uncertain whether the pulp in the molar is alive or not, but I call your attention to the enlargement of the root; also the loss of tissue between the roots, and as a result decay has started, entering the distal side of the mesial root and also the mesial side of the distal root.



FIG. 12.



FIG. 13.

This lower bicuspid was originally capped, and an attempt was made to remove the pulp and cleanse canal to the end. The dentist unfortunately did something which is liable to happen to anyone; he left a portion of the broach in the root canal, which you see, and you also recognize the impossibility of removal; it also shows that an attempt was afterward made to get it out, and the failure, and that a diseased area was the result.

Necessity for Extraction.

I showed you just now the case of a tooth where extraction was the only cure. We as dentists are all inclined to be very conservative as to attempting the saving of teeth. I wish you would recall the last picture shown, then look at the next, and I will show some others, illustrating the fact that it is our duty in making a proper diagnosis to determine absolutely whether the tooth can be properly preserved; and in no field is the radiograph of more value than in this, because if a tooth can not be properly

preserved, it is our duty to have that tooth removed as soon as possible; not only because of its irritating effect upon the surrounding tissue, but because of the toxic absorption that is bound to proceed from any such pathological condition.

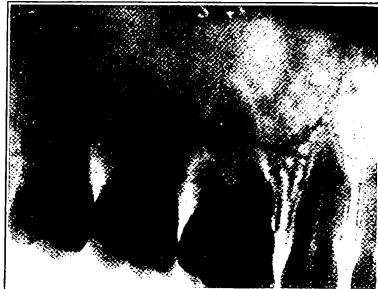


FIG. 14.

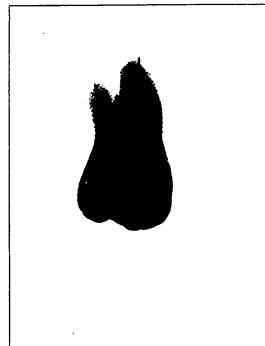


FIG. 15.

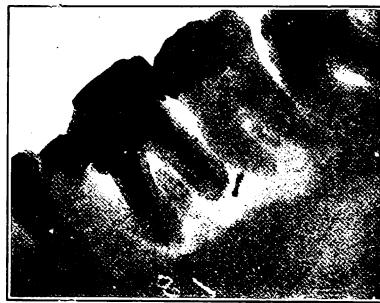


FIG. 16.

We have here another molar where the dentist
Figs. 14 and 15. has broken two broaches and left them in the roots.

The pictures show the result. This patient came to me one day with her sister from Brooklyn (the sister being a patient of mine), and wanted to know whether it was possible to save this molar. She said that her dentist had sent her to have it extracted, but she knew the value of the tooth and did not feel like having it extracted without getting my opinion. After taking this radiograph, it was a pleasure for me to confirm the advice of her dentist to have the tooth removed at once. Fig. 15 shows the tooth after its removal.



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This is another picture of a tooth with a piece of a steel instrument, very likely a broach, left in the root. This was not so important because it was easily removed. A careful inspection of that molar shows that there is absolutely no portion of the pericemental tissue that has any attachment, and that any attempt to preserve that tooth would be a failure. For that reason it was removed, although the canals were filled to the very end.

Fig. 16.

This represents another case where extraction was ordered. These last pictures represent what is known as pyorrheal cases. This is taken from the



FIG. 17.



FIG. 18.

mouth of a woman who had a distinctly pyorrheal mouth, and frequently in advising in regard to conditions of this kind, where patients have been sent to me for consultation, I am confronted with a condition like this—a simple alveolar abscess due to dead pulp. This represents a third lower molar, very loose and shakey in its socket, and the radiograph shows there is absolutely no tissue for these roots to be attached to or to which they are attached—and it is perfectly futile to treat that kind of a tooth; it has passed the stage of remedial agencies of any kind.

This is a very beautiful and instructive picture.

Fig. 18.

It is one that has been loaned to me, and I have taken a great deal of pains to follow up the clinical history of this case because of the merits of the picture. We see here the remains of an alveolar abscess and the lost tissue; we see that the canal has been thoroughly cleansed, and we see that the operator forced gutta percha beyond the root, and from the picture you can see that all that operation was done under perfectly aseptic precautions. I have yet to

see the radiograph of the end of a root, or the osseous tissues surrounding the root, with any sign of inflammation resulting from gutta percha forced beyond the end of the root, where the gutta percha was in a truly aseptic condition. I know of no other filling material of which this can be said. I do not say that some of the other fillings, such as paraffin or wax, may not act in the same way, but I have not examined any of them with the X ray so as to demonstrate their sterility. Metallic fillings will not be compatible to the tissue, nor will any of the cements, as they are all more or less irritating, and I lay great stress upon the fact that a number of radiographs that I have carefully examined, and where I know the clinical history, demonstrated beyond a doubt the compatibility of gutta percha with the tissues surrounding tooth roots.



FIG. 19.

You said we might interrupt you. You promised me you would tell us how to remove broaches that are broken off.

Dr. Ottolengui.

With reference to pieces of broaches in root canals that are deep and inaccessible, I have been successful in a large percentage of cases, where I could loosen the piece and yet be unable to remove it with the delicate instruments that are on the market for that purpose, by magnetizing another broach and placing it in close proximity to the broken broach, when the magnetic attraction from the magnetized broach will draw the broken piece away with it.

The Use of Wires for Diagnosis.

I now want to speak of the advantage, for diagnostic purposes, of placing wires in canals before using the X ray.

In treating root canals it is not always easy to tell whether you have reached the end of the canal or how far you have reached. This picture

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(Fig. 19) represents an abscessed bicuspid that is under treatment, and a fine gold wire has been put in as far as it will go, to find out whether the end of that root is really open or not, and by that I mean open wide enough to admit an ordinary sized broach to pass through. Frequently we are in doubt whether the tissue we touch, and which responds to



FIG. 20.



FIG. 21.



FIG. 22.

sensation, is pulp tissue, and there is nothing so valuable as radiography for making this diagnosis, by placing wire in the root canal, and then making a radiograph. In this instance (Fig. 19) we see that the wire extends beyond the end of the root. We have on the side of this picture an illustration of one of those common occurrences, a gold cap with the distal root poorly filled, and the mesial root not at all filled; the diseased condition at the root ends is apparent.

In this picture we see a diseased condition, be-

Fig. 20. between the roots of the molar, where the operator had drilled between the lingual and the buccal roots, instead of following the lingual canal. The wire not only passed through

that opening, but up into the antrum. This is one of the possible methods of causing antral empyema—not only is it possible, but I have no doubt it quite frequently occurs.

This is another case taken after one treatment,
Fig. 21. in order to determine how nearly we had reached the end of the root. After seeing this picture, I concluded that about two more sittings would be needed before we could, by chemical means, reach the end of these roots. These are gold wires.

This is another picture showing where wires
Fig. 22. have been used for the same purpose. This is a molar in a pyorrheal mouth, and the pulp was in a



FIG. 23.



FIG. 24.

very badly diseased condition with the consolidation that is so common in the buccal canals. Note how far this wire in the mesial buccal canal extends; also the one in the distal buccal canal, which is very short. The wire in the lingual canal goes to the end of that root. These wires are placed in the roots of the teeth when treatment for the day is completed, and any medication that is used is placed with these wires, and the radiograph is then taken for its diagnostic value. In other words, as you will see from the pictures I have shown you, there is absolutely no assurance of a tooth remaining healthy unless you reach the end of the canal. It matters very little how beautiful your superstructure may be, if your foundation is defective, and it means more to us than the building upon a weak foundation, if we leave in the mouths of our patients the opportunity for infection. It is for that reason I consider this method of determining the length of the canal one of the most valuable adjuncts in treating the root canals.

This is another picture illustrating the same subject. I have since taken another picture showing the wire down further, but so lately that it was
Fig. 23.

impossible for me to get a slide of it. This molar, with the gold cap upon it, shows the condition the canal of the bicuspid was in when I entered it, the pulp having been removed and the canal left filled with a substance that made me feel sure, not only from the condition of the soft substance in the canal, but from what I knew of the dentist who had treated it, that mummification had been practiced, and that it was considered unnecessary to fill the root. I am speaking of the bicuspid; I have not as yet entered the canal of the molar.

Fig. 24. This is a very interesting case; I refer to the upper first molar. This was also a pyorrhreal case, and you will observe the great loss of alveolar tissue



FIG. 25.

between the teeth; you can always distinguish these cases as pyorrhreal on account of this loss of tissue. There was a beautiful filling in this tooth, but the curved buccal root is unfilled. This is an upper molar, and you can see where the dentist has entered the canal and what a short distance he has followed the canal. We take a picture of such a tooth originally to find out how to reach the end of such a canal. From the picture I determined that we could only reach that canal by cutting away sufficiently to enter in a more direct line. I have only given this case one treatment, and the next picture (Fig. 25) is a radiograph of that tooth after one treatment of the mesial root. I confined myself entirely to the attempt to get to the end of the mesial root at that first sitting, because I made up my mind there was no use troubling her with treatment of the other roots unless that root could be cleaned to the very end. If I could reach the very end of it I felt sure of the saving of that tooth by splinting it to the bicuspid, but I did not want to splint a tooth to that bicuspid with a necrosic root end.

This shows how far we got at the first sitting, and you see the difference between this and the other picture. This also shows the tract of the

alveolar abscess. You will observe I simply utilize the pulp chamber to turn the end of the gold wire over to hold it in position; I have entered from the most extreme side of that cavity to get as nearly as possible on a direct line with the end of the root, and I only knew of that from my study of the radiograph, and you can see what can be done if the proper angles are studied in attempting to reach the ends of some teeth which it appears to be impossible to reach. I have no doubt I will get to the very end of that root.



FIG. 26.



FIG. 27.



FIG. 28.

Alveolar Abscesses.

I will now exhibit a series showing various stages in the treatment of abscesses.

Fig. 26.

Fig. 26 shows an alveolar abscess on an upper central incisor, with the end of the root necrosed.

Fig. 27.

Fig. 27 shows the tooth with the root filling of gutta percha extending through. I might add, this case is one where there was an open fistula.

Fig. 28.

Fig. 28 is a radiograph taken after the end of the root had been amputated.

Fig. 29.

This is another case of an abscess resulting from a gold cap on an upper bicuspid. You see the diseased condition and no root filling.

Fig. 30.

This is another picture of the same tooth showing the condition after the root canals had been thoroughly cleansed and treated.

Fig. 31.

This shows the filling of the two canals of the first upper bicuspid.

I exhibit these to illustrate the stages of treatment of one particular case.

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FIG. 29.



FIG. 30.



FIG. 31.



FIG. 32.

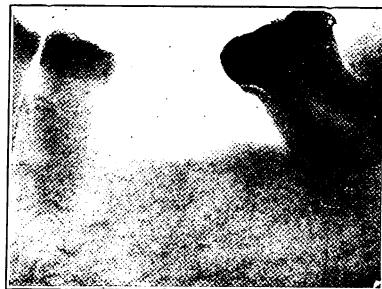


FIG. 33.

We were talking about splints last night, and
Fig. 32. there are different kinds of splints. The use of a
 splint to bind loose teeth together is merely a utilization
 of our knowledge of what permanent bridge work does. The point
 is that in doing such work it is necessary to thoroughly cleanse the canals

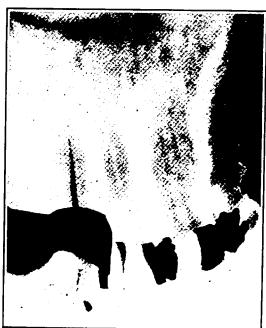


FIG. 34.



FIG. 35.



FIG. 36.



FIG. 37.



FIG. 38.

to the end, that is, the end of the root must be aseptically sealed. This is a patient who came into my hands recently. I have not done anything with the case as yet; there is an abscess on the bicuspid, with an exudation of pus, but the patient is loath to have this bridge removed; but you can see

how far the root filling extended. What I claim is that no dentist had an honest right to insert a bridge upon a tooth with the canal left in such a condition.

I started to insert some other bridge work in other parts of her mouth, and the next picture I will show will be a comparison of this form of root filling and the root filling in the lower molar where I placed a removable bridge.

This shows a lower molar. You see the root

Fig. 33. filling, and if you observe it closely you will see that it extends to the very end of the canals, and these were not easy canals to reach. I show this to demonstrate what can be



FIG. 39.



FIG. 40.

done, but it can not be done in one sitting, and it can not be done by instrumental work alone.

This is another case of a bridge of which I know

Fig. 34. the history, in part, very well. It extends from the upper cuspid to the molar, and the pulp was removed from the cuspid by cocaineization. The dentist who did the work told me: "I told the patient that the only way I could insert a bridge would be to utilize the root of the cuspid, and I removed the pulp and filled the root immediately." Here you see the result of an immediate root filling. You see the abscess tract over the end of the root.

This picture illustrates how far it was possible

Fig. 35. to go in that particular tooth after removing the bridge.

This is an upper bicuspid that was very loose and had a chronic abscess, and the picture shows the portion of the root that was not filled.

Fig. 37. This shows the wire through the end of the root, indicating how far it had penetrated.

Fig. 38. This shows the same case with the root canal filled, and you will observe the gutta percha protruding through the end of the root.

I want to speak again about that. That gutta percha was left there



FIG. 41.



FIG. 42.



FIG. 43.



FIG. 44.

and the picture taken about six or eight weeks afterward, and anyone who understands the reading of radiographic work will recognize at a glance the absolute absence of inflammatory action around the gutta percha. It is more important that the gutta percha should pass to or run through the end than that any part of the root should not be filled; and this is one of the lessons I wish to emphasize.

Correct Root Fillings.

Fig. 39. Here are two central incisors showing perfect root filling, after the treatment of abscesses.



ITEMS OF INTEREST

Fig. 40.

This is another one of the same kind. I am showing these to illustrate what a good root filling is, how it should look, and how it should reach the very end of the root.

Fig. 41.

Some of these pictures are not as easily demonstrable with the lantern slides as they are in a film.

Besides that, most of these pictures—not all of them—have been enlarged in order to show the differentiations more clearly. I say that, because some of the audience may regard this enlargement as



FIG. 45.

a distortion. This picture has been enlarged deliberately, as a photograph is enlarged, and is intended to show a perfect root filling, and it also shows an impacted third molar.

Fig. 42.

Here we have a gold cap on a lower molar after it is in proper condition to receive a gold cap, and you see the difference between that and others I have shown.

Fig. 43.

This is a picture that has not been enlarged. You see the difference in the size of the teeth. You see here a perfect root filling in the third lower molar. These are not easy canals to fill. The first molar has not yet been placed under treatment, but from the condition shown there is no doubt that we have dead pulp in the roots of that molar. This picture shows very beautifully the mandibular canal.

Fig. 44.

This is the last picture of good root fillings I have selected to show you, and I am sorry the picture is as dense as it is, because it does not show as well as I would like what I consider a beautiful result in very difficult

root canal filling in the second molar. In the negative, both of the canal fillings are easily discernible. You see them extending to the end of these curved roots. There were six treatments of sodium and potassium in these roots before they were filled, but by that time we knew we were at the end of the canals. I desire to emphasize the point that very much can be accomplished chemically in canal cleansing, where it would be absolutely unsafe to trust solely to instrumentation.



FIG. 46.



FIG. 47.

Splinting Loosened Teeth.

Incidentally I placed among these pictures a very simple form of splint. This is an interesting case; it represents an upper central incisor with the abscessed tissue extending almost all around it; but if you will look at the picture carefully you will see that there are certain places where there is pericemental union.

I took a radiograph of that two years ago (not this radiograph, but a radiograph of the condition of the central after I removed the pulp) a few days before leaving for Portland to attend the Pacific Coast Dental Congress, and asked my assistant to send me the picture and to temporarily splint the tooth. I received the picture, with a note saying they thought it foolish to waste the patient's time over that tooth, because it looked like a hopeless case. This central was so loose that the patient wobbled it in and out with his tongue, and you see the great space between it and the next central, and can realize the difficulty of replacing that tooth if extracted. After I had carefully studied the negative I wired back from Portland not to remove the tooth, and when I came home I removed the pulp of the lateral, filled the root as you see, splinted the two teeth together, and they are in that condition to-day. That splint does not show from the labial aspect at all. What you see is only apparent on the lingual surface, and there is absolutely nothing to be seen labially. I can see no difference, whether for a man or a

Fig. 45.

woman, why we should disfigure the patient labially by a lot of gold when the teeth can be properly splinted in this way. The point I want to make while speaking on this subject is that a splint should be constructed, when used for this purpose, under these principles—that the strength for holding the tooth should be as much as possible in the root, not in the crown; that in order to get all the strength possible we must enter the canals and utilize the strength of the roots themselves. Then, again, there should be nothing added to the surface of the tooth. There

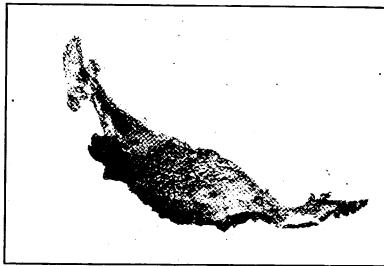


FIG. 48.



FIG. 49.

is no excuse for adding gold, it makes the surfaces more bulky and makes it more difficult to carry out any hygienic precautions necessary for the preservation of the tooth.

History of An Interesting Case.

This is a case of a woman of about forty years of age who developed a sudden condition of anesthesia, or lack of sensation, extending from the symphysis back to about the second molar. One side of the face commenced to lose all sensation, and as day after day went by that condition became more marked, and, as she described it, the inside of the tongue of that side of the face commenced to get "a fuzzy feeling." My experience with a number of cases of tic-douloureux led me to feel at once that we had struck the starting point of irritation of the nerve itself, which was bound eventually to lead to a true case of tic-douloureux, and there is no point in the practice of dentistry that is more interesting, and where our services are of greater value to the general public, than when we can as dentists place our fingers upon the exciting cause of irritation in any part of a nerve which is starting a nerve disease, for when it once

becomes aggravated and reaches the brain centers no cure has ever been found that has any permanent value. Physicians speak of tic-douloureux as a general neurosis. You will read of countless forms of treatment for it, but they are all of a tentative sort. We as dentists realize the fact that if we could reach the initial point of nerve irritation the disease could be stopped, and that is why it is the sacred duty of a dentist who is practicing from a professional standpoint that he should qualify himself in such a way as to properly diagnose cases.

Fig. 46 shows the inflammatory condition

Fig. 46. around the end of the root of the bicuspid. This picture shows this intensification of the osseous

tissue. After a careful study I determined that the pulp in that bicuspid was diseased, and that the diseased condition was the initial cause of irritation affecting the nerve trunk as it emerged from the mental foramen below. I felt that surmise was sufficient to warrant the removal of the pulp.

Fig. 47 shows the canal after the root had been

Fig. 47. filled, showing a slight protrusion of gutta percha.

This picture was taken about four weeks after the operation, and the active inflammation seems to have subsided. From the moment that pulp was removed the improvement of the patient began. Sensation to almost three-quarters per cent. returned within twenty-four hours; all the anesthesia practically disappeared. The improvement was continuous, and to-day the patient is practically cured after three months.

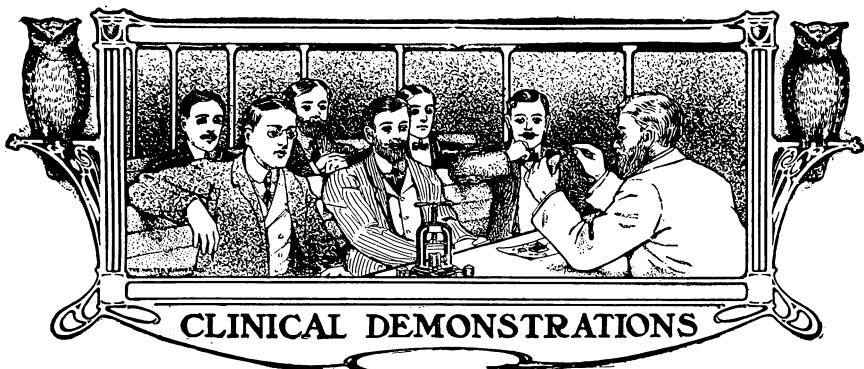
I sent the pulp to Dr. Vida Latham, of Chicago, who is perhaps the most skilful person we have in the microscopic examination of the pulps of teeth. She made a section of it.

Fig. 48 shows the section slightly magnified, and

Fig. 48. you observe at once the pathologic condition.

The next picture (Fig. 49) shows it much more highly magnified.

We have here what has been so often disputed as to the condition of the pulp—regular fat cells in the pulp tissue, which can not deceive us for a moment, and this microscopical examination of the pulp bears out conclusively the correctness of the diagnosis as to the necessity for the removal of that pulp. It brings up what I wish to close with, this important point: The altered condition of pulp tissue in adults is something of which we know practically nothing. It is improbable that in advanced years pulps retain a truly physiologic relation, and the problems of tissue changes due to diseased environment are practically unsolved, and here we have a vast field for study by future students.



Report of Clinic Committee of the New Jersey State Dental Society.

Logical Treatment of Deciduous Teeth

Dr. Thomas E. Weeks
Philadelphia, Pa.

Clinic was to demonstrate a logical handling of children and the treatment of their teeth, which through neglect had become badly affected; also a prophylactic treatment of the permanent molars where caries had penetrated the enamel to the dentin.

Patient.—Girl about ten years of age. First operation. Left inferior first-permanent molar cavity in occlusal surface, pulp exposed, showing signs of slow progressive devitalization. No history of previous pain. Upon removal of softened dentin a drop of bright red blood appeared.

Instrumentation.—Opening the cavity and shaping the enamel with chisels Nos. 47 and 48. Removing softened dentin with right and left contra-angle spoon excavators 2 mm. wide. No effort was made to give the cavity angular form or to remove any infected dentin which was hard.

Treatment.—Covering the exposure and pulpal wall with a creamy paste of jodoformagen cement, *flowed* over exposure *without pressure* and allowed to harden—time, three minutes. Enough of the paste was used to fill the cavity one-third full. Cavity then stopped with Gilbert's temporary stopping, warmed until very soft.

Prognosis and proposed subsequent treatment.—If tooth remains quiet for a week the temporary stopping should be removed, the jodoformagen examined, and if intact should not be disturbed. The cavity should then be filled with Ames's new process oxyphosphate of copper.



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If this treatment is followed we would expect the pulp to retain its vitality, as many have in operator's practice, under similar conditions and treatment. The rationale of this treatment is to disturb the tooth and pulp as little as possible, depending upon the germicidal stimulating and embalming properties of the jodoformagen and oxyphosphate of copper to assist nature in her efforts to combat the disease.

Second operation, same patient.—Right inferior first-permanent molar, cavity in occlusal surface just penetrated to dentin, enamel not broken down.

Instrumentation.—Fissures opened with small pear-shaped dentate bur; no effort was made to remove any infected dentin which was not soft. Also right inferior second deciduous molar, approximo-occlusal cavity, deep penetration, no exposure. Instrumentation, same as in permanent molar on left side.

Filled both cavities with new process oxyphosphate of copper.

Prognosis.—Filling in deciduous molar should remain and preserve the interproximal space until the tooth is exfoliated. Filling in permanent molar should last several years. If it should wear from attrition it may be restored without removal by simply freshening the surface and adding more copper cement. No pain was inflicted; result, a happy child, who seemed not at all anxious to leave the chair, although in the beginning she evinced all the signs of nervousness and fear.

The operator's faith in this treatment is based upon an experience of nearly twenty years, in which time hundreds of teeth have been saved until the patients attained an age where more permanent operations were warranted. The teeth, too, were benefitted by the treatment.

The chief factor is that results are accomplished at a minimum of pain and expense.

Permanent Cement Fillings

Dr. D. Genese
Baltimore, Md.

A staple phosphoric fluid that will mix with any oxid or silicate powder now on the market, retaining the translucency of the silicates and improving the plain oxids, producing a tooth-like substance of great density, as a very large quantity of the body can be incorporated in a small quantity of the fluid, which will work into a smooth mass that will not set too quickly either in summer or winter, giving ample time to work, but quick enough to condense and burnish the filling, which will not discolor at the edges, warp or crumble, but remain close to the margins of the cavity. The fluid will not change by age nor become thick or cloudy. The mixture, after hardening, is impervious to acids, alkali



or alcohol. Steel should not be used in mixing, nor put into the fluid. A thick piece of iridio-platinum wire let into a handle hammered to desired shape makes the most satisfactory instrument for use while filling and forming contour, and will insure complete absence of discoloration of the finished work. Agate is good, but liable to snap off on pressure. Glass annealed is excellent for mixing. An important point in using this fluid is that in mixing either powder or fluid can be added at time of mixing and thoroughly incorporated into the mass, producing a smooth paste. It can be cut soon after by sharp edge tools without tearing, and if the filling is too full, dressed down with finest cuttlefish disks, slightly touching and at high speed, and burnished with agate or glass.

Coloring Silicate and Oxid Cements using Phospho Aluminate of Lime

Dr. D. Genese

Baltimore, Md.

The system of coloring is facilitated by utilizing the waste pieces, also in the following manner:

Take any color desired: Chrome, oxid titanium, oxid silver, aluminum, gold, etc.

Add a preparation to the phos. alum. of lime and triturate until incorporated, then add any base of silicate or oxid to form a cement; let this harden, grind and use the powder as a colorant. A little practice will give definite results, and one can always match a filling to the tooth with the certainty of leaving no streak of color or pits to mar it. It will incorporate with the filling, and to those distant from a depot is a valuable aid to matching color.

Orthodontia

Dr. U. H. Jackson

Dr. Jackson demonstrated his system of orthodontic work and orthopedia of the face.

Models were presented of two cases of prognathism, showing the conditions before and after treatment. In each case the features in the region of the upper maxilla needed to be made more prominent. The conditions were corrected by removable equalizing devices, in effect jumping the bite backward.

Models of two cases requiring the opening of the bite for the correction of extreme irregularity of the teeth, and for depressing elevated incisors, were exhibited with apparatus used. The models showed the extreme movement of the teeth with but a few visits. Dr. Jackson demonstrated how easily the bite can be opened in a few moments for assisting the movement of the teeth when required. Cases presented showed the



attachment of a metal shelf to the appliance back of the upper incisors for the depression of lower incisors through occlusion; also the opening of the bite on one side of the arch by extending metal over the grinding surface, to permit the free movement of the molars, bicuspids and cuspids on the opposite side. Apparatus for causing the unilateral expansion of the arch, made by connecting to the appliance on the side of the arch not to be moved a flange made of plate metal, rising above the grinding surface about three-sixteenths of an inch to rest on the palatal side of the teeth of the opposite arch in occlusion.

Models of the case of a child aged four years with appliances for expanding the upper arch laterally and the lower arch laterally and anteriorly.

Models with apparatus showing the extensive movement in the expansion of the upper and lower arches, where the cuspids on one side of the arch were too prominent, the lateral incisors resting against the first bicuspids.

Many other models with appliances were shown for the correction of various forms of irregularity, including the rotation of the cuspids, bicuspids and molars.

Fracture of the Mandible at Symphysis

Dr. Alice M. Steeves
Boston, Mass.

Fractures may occur at any point of the jaw, if sufficient force be applied in the direction to produce the fracture. Many authorities contend that we never get a fracture at the symphysis. I have been unable to find any literature on the subject. However, a case was reported from a New York hospital, and the following case came under my observation.

Franc G., Scandinavian, aged twelve years, referred to me by Dr. F. Coolidge.

Family history.—Tubercular.

Clinical history.—Two months ago was playing and fell on sidewalk, and struck tip of chin on a small stone; contusion followed, together with soreness of lower central incisors; after a few days swelling increased, with the formation of pus, incisors became loose and large sac of pus formed, pointing on the chin. This was lanced by Dr. Coolidge, followed by a copious discharge of pus; in a few days the right incisor began to tighten in its socket, but the left remained loose, and pus continued to drain from the opening on the chin.

When the patient came into my care, after a careful examination, I found that the probe passed up through a sinus until it encountered the root of the left central.



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Treatment.—The necessary antiseptic precautions taken. The left central incisor was extracted. Crepitus was distinct, although slight because of even balancing of the muscular traction. The carious bone was removed with a large bur and the sinus packed with iodoform gauze. After two days this was removed, parts cleansed, a cap splint cemented to the lower teeth (from first molar to first molar) and dressing of dilute H_2SO_4 used every two days for two weeks, when the patient was dismissed to report in two weeks, when the chin had completely closed. Patient reported again in two weeks, splint removed and discharged well.

Temporary Crowns of Silicate Cements.

Dr. W. Clay Middaugh
Easton, Pa.

Having prepared the root for the permanent crown, hastily fit a platinoid post into canal, leaving the end protruding. Now cut a disk of paper, celluloid or copper, to approximately fit the end of the root; punch hole in center and slip over end of post protruding from root. This is done to prevent the moisture exuded by the gum tissue from coming in contact with the setting cement. The ideal procedure from this point would be to select a suitable tooth mold made of celluloid, or some similar material, about the thickness of the celluloid strips we use in silicate cement work. These molds should be open only at the cervical end. Fill the mold with cement of the proper shade, carry it over the protruding post end and press firmly against the disk. The post will be imbedded in the cement, and the soft disk will conform to the shape of the root and give security from moisture during the setting process.

Being unable to have any of these molds made up, a mold was constructed from a section of a Mimack's celluloid strip. After the cement hardened, the mold and disk were removed, and crown set with temporary stopping. If the temporary crowns are ground so the occluding teeth do not touch, they will very creditably fill a space for weeks.

It is to be hoped some of the manufacturers can be persuaded to place a set of molds or matrices on the market in the near future. The twelve anterior teeth, upper and lower, are all that would be necessary, as it is easier to persuade a patient to go a few days without a bicuspid than an incisor or cuspid. This crown can be made and set in thirty minutes.

Pyorrhea

Dr. R. G. Hutchinson, Jr.
Brooklyn, N. Y.

Dr. Hutchinson exhibited three cases of pyorrhea from his private practice which he had completely cured by surgical treatment alone.

In one case the two upper first molars were most seriously affected.



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having contained septic pulps. The pulps were removed, roots disinfected and filled in conjunction with the pyorrhea treatment externally. Treatment was completed last January, and there has been no recurrence.

Second case treated February, 1906, all over mouth, no recurrence. In this case there was extreme lack of occlusion, which was corrected two years subsequently by building up lower molars and bicuspids with gold castings cemented on separately. Occlusion was established and bite opened about one quarter of an inch anteriorly. There was an immediate and marked increase of stability of teeth due to restored functional activity as organs of mastication occluded properly.

Third case, one which was operated on recently in which extensive caries of the process had existed, causing very serious systemic disorder covering a period of about one year, during which patient had lost about thirty-five pounds. Physicians had treated for stomach disorder, stating that the disease of the mouth was due to systemic conditions. Constitutional treatment was unavailing, and patient continued to grow worse. Surgical treatment, consisting of scaling and curetteing and washing pockets with antiseptics, begun June 24 and completed July 6, in all five sittings, on different teeth at each sitting. Condition cured and constitutional health being rapidly restored by removal of cause of gastric toxemia.

Splint for Pyorrhea Cases Dr. Raymonde Adair Albray Newark, N. J.

The splint which I am using in conjunction with pyorrhea treatment is useful principally with the loosened molars and bicuspids, although it can be used for the incisors.

In construction it is similar to the retaining wire clasps of the Jackson orthodontia appliances, differing in that the spring wire alone is used on both the labial and lingual surfaces of the teeth. An accurate model is obtained and the teeth carved slightly toward the gingival margin, which causes the appliance to fit closely when put into place in the mouth. Number 20 or 21 nickel silver wire is used, being shaped to fit the tooth exactly. A separate clasp is made for each tooth to be included in the splint; the clasps are then assembled on the model and soldered together with chemically pure tin. The points to which the tin is to be applied should be roughened slightly with a fine file. The splint can then be heavily gold plated, and it is ready for insertion into place.

No cement, ligatures or other medium is necessary to retain it, as the spring of the wire is sufficient to keep it in place and hold the teeth firmly, giving them almost complete surgical rest.



The case presented, of course, determines the exact form in which the splint is to be made, but the general principle remains the same and is amenable to a great many variations. With the splint in place the teeth are easily brushed clean by the patient, and are also supported while the dentist is scaling or otherwise treating them.

The models show the form and possibilities of this splint much better than any written description could.

Gold Filling
Dr. Horace T. Beemer
Newton, N. J.

This clinic will consist of preparing a cavity in the disto-occlusal surface of an upper bicuspid, and making a gold filling in same according to the methods of Dr. G. V. Black.

The cavity margins will be extended buccally, lingually and gingivally into areas of comparative immunity to decay. The cavity will be made with the occlusal step anchorage, flat gingival and occlusal seats and parallel walls. No undercuts or pits will be made as an aid for retaining the filling, but the general shape of the cavity and through condensation of the filling material will be depended upon for retention.

This form of preparation makes every part of the cavity readily accessible, so that the filling may be made with a single plunger. Dr. Black's and Dr. Wedelstaedt's special cutting instruments will be used.

The gingival third of the cavity will be filled with unannealed gold by placing a cylinder in each of the gingival angles and a third cylinder between them, securely keying the whole into place. The remainder of the filling will be made with annealed gold, each pellet or ball used being of a definite size.

The gold is specially rolled into cylinders and pellets, from No. 4 unannealed gold foil, in the manner taught by Dr. Black.

For condensing the gold a Wedelstaedt hand mallet is used by a trained assistant, giving a blow of about ten pounds, and the force of the blow is augmented by hand pressure of twelve to fifteen pounds, thus insuring thorough condensation.

The excess of gold in the interproximal space is removed with a Black saw, and the filling trimmed to form with Wedelstaedt interproximal trimmers and Black knives, after which the whole filling is given a final polish following Dr. Black's method throughout the whole procedure.



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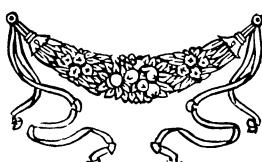
Gold Inlay

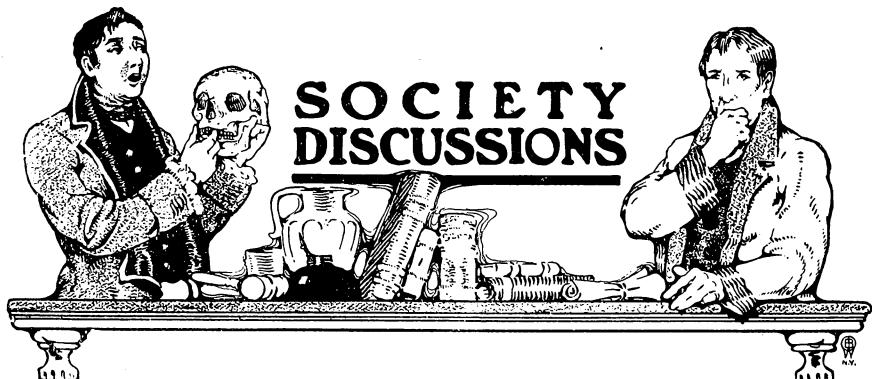
Dr. R. S. Clarke
Mt. Holly, N. J.

An original method of investing a wax model whereby a perfect gold inlay can be cast in from thirteen to eighteen minutes, including investing, drying, burning out wax, melting gold and casting (on Clarke centrifugal machine).

The wax model is fastened on the sprue former by means of copper wire. Take about a teaspoonful of water in small rubber cup and add Klewe & Co. I. D. L. investment material slowly, until all the water is absorbed, then without stirring take a camel's hair brush and coat the wax and sprue former to depth of one-eighth of an inch or more. In a larger rubber bowl take three-quarters of an ounce of water (or a Thurston's cement bottle filled to neck) and add fine sand measured in an empty seven-eighths S. S. W. paper disk box, then add ten grains of sodium chlorid (table salt); after stirring take an equal quantity of plaster of Paris as of sand, and stir quickly and pour into rubber ring into which the coated wax model is carefully dropped into position. Measuring saves time, as the element of chance is eliminated. The salt causes a rapid hardening of investment, and in from three to five minutes it is ready for drying process. It is then easily pushed out of rubber ring and immediately placed on a low flame. Heat is applied gently at first, and as soon as warmed through, the blowpipe is used. This step occupies from three to five minutes. As soon as the wax stops burning at the sprue hole the investment is transferred to arm of casting machine, where it slides easily into position. It takes about two minutes to melt pure gold on separate tray, and the actual casting is done in a very few seconds. By this method there is absolutely no danger of explosions from confined steam, and the investment is hard enough to withstand an intense heat.

If these simple steps are carefully followed a perfect inlay is the result.





SOCIETY DISCUSSIONS

New Jersey State Dental Society—Thirty-Eighth Annual Meeting. Evening Session.

President Woolsey called the meeting to order.

On motion, a quorum being present, the roll call was dispensed with.

The president then introduced Meyer L. Rhein, M.D., D.D.S., of New York City, who delivered a lecture entitled "Root Radiography."

Discussion of Dr. Rhein's Paper.

**Dr. M. T. Schamberg,
New York.** We have listened to a very interesting lecture upon the subject of radiography in connection with

root canal work. I am the last person in the world to offer any advice concerning the perfect filling of root canals, because that is far removed from my own line of work. But I do find that in dental radiography I have gleaned some knowledge as to the pathology of the periodental tissues, and the value of perfect root filling in the prevention of many of the dreaded diseases associated with the mouth and face.

I have found that imperfect root canal work is, as you will understand, one of the most potent factors in the production of alveolar abscesses; it is at the same time a very frequent cause of obscure facial pains that are at times reflected not alone to the ear, to the eye, but even down to the chest; pains on occasions have been looked upon by nerve specialists as neurotic, whereas dental troubles were really responsible.

Radiography is an advance in dentistry which has come to stay, and it has put dentistry, as Dr. Rhein has stated, on a more certain basis. A



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great deal of the dentist's work can be seen when he operates on the crowns of teeth, but as soon as he is compelled to open the canal of a tooth, he is working absolutely in the dark, and it is surprising the amount of information that can be secured by the study of a radiograph of the part.

I have repeatedly found conditions, as have all who have worked with the X ray, that were entirely unsuspected, conditions not looked for when the radiographs were taken, and I am much impressed with the very careful study that Dr. Rhein has made of the value of radiography in his work by the taking of a series of pictures during the progress of filling the teeth.

I can only commend what he has said, but I wish to emphasize the fact that the main value of radiography and the most important point is the interpretation of the picture. Many of these pictures that were thrown upon the screen I dare say were Greek to you until Dr. Rhein explained them, owing to the fact that many of you have not given this matter any study; many of the pictures were apparent to myself and doubtless to others who have been working in radiographic work. I have made it a practice in dental radiograph work to send the film to the dentist, because the original film is better than any possible print from it. No print, no lantern slide, can convey the knowledge that is imparted by the film itself, and for that reason I believe that every dentist should practice the reading of the films rather than the prints.

I hardly think it is fair, when there are so many gentlemen present thoroughly capable of discussing this paper, that I should be called upon, and I do hope that when I sit down we shall have a more general expression of opinion on this subject, for this reason: This is not a topic which is foreign to your everyday work; every man in this room, if he has any claim to the retention of his license to practice dentistry, must know something, must to some extent be an expert in this matter of properly filling the roots of teeth.

It seems to me the vital point of all we have seen to-night is this—that unfortunately it is true that the most expert operators can not reach the ends of all root canals. I say that is unfortunately true, because it is human for all of us to feel under those circumstances that we have done the best we can when too often such is really not the case. Because of the difficulty in doing this work we are apt to stop, when, with a little more effort, we might have gone, as some of these pictures have shown, to the extreme terminal of the root canal and so have prevented subsequent abscesses of the teeth. I say that is a misfortune, but it is our

**Dr. Ottolengui,
New York.**



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good fortune that we now have the aid of the X ray and a few men who work with it and can bring us such demonstrations as we have seen to-night. I am going to take the liberty of saying what Dr. Rhein has not said, and what perhaps he can not say, that many of these pictures of imperfect root canal fillings shown to-night have come from the hands of very prominent gentlemen, men who undoubtedly felt they had done the best they could; and yet you see the subsequent development proved that better could be done in those identical root canals. I dwell upon this because it is the vital point, as I have said. I remind you of that picture where Dr. Rhein showed two roots, one of which had been filled by his assistant and the other by himself, and where in neither case had the operation reached the extremity. But the great difference in the treatment of these two teeth was that in one case the assistant, the operator, reached the limit of his ability in one sitting: in other words he decided at the end of one sitting that the rest of the tooth was solidified, and that he had gone as far as possible. But Dr. Rhein's treatment of his tooth was not like that, he was not so quickly satisfied, and while he did not go to the extreme end, the fact that he gave five or six treatments with anti-septic remedies, so thoroughly sterilized the canal and the tubuli in that root, that although there was no definite canal he thoroughly, by his treatment, asepticized the balance of that canal, so that it was safe. One operator stopped at the end of mechanical treatment of the dead part of that pulp, while the other operator went on and went further, because what he failed to accomplish mechanically, he succeeded in accomplishing chemically, by destroying the material and converting it into something which never afterward could become pabulum for infectious micro-organisms. That illustrates the difference between going as far as you think you can, and going a little beyond what you think is the end, and there is no more eloquent argument against jumping to the conclusion that because you have taken out of a root what looks like a whole pulp, you have reached the end of it.

I recall to your mind that other case, where a dear friend of his, and of mine, by immediate root filling sacrificed a beautiful piece of bridge work he put on afterward, because he had not reached the end of the root; I agree with the essayist when he said that had that same gentleman simply dressed that canal and approached it at another sitting, when he would not have been confused by the flow of blood and lack of sensation caused by the use of the anesthetic, he would have discovered, through sensation alone, that there was more to be done.

So there should be persistent determination to get to the end of the root, and by following that course you will find you will reach the end



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many more times than if you fill canals after a few applications of broaches.

The Question of Fees for Root Treatment.

There is another and important side to all of this. I am afraid there are a great many men in the country who believe that this kind of work can not not be thoroughly done, because they will not be paid adequately for it. If that be so, it is our own fault, partly due to the habit some men have in making out their bills of charging so much for the filling and so much, and a lesser fee, for treatment. As a matter of fact, a dental service is a dental service, and if you fill a tooth, or put a crown on a root from which you have not thoroughly removed the pulp, you are not earning the fee that you charge, and if that is thoroughly explained to your patient there is no reason why that patient should not pay, and pay willingly, for the treatment which will save the tooth; certainly quite as willingly as he would pay for a filling or crown which does not save. There is no reason why treatment should not be paid for any more than that a man should not pay for the foundation of his house. Who would care for a beautiful structure erected on the ocean beach here with no solid foundation under it. A man who would allow a building of that kind to be constructed, and pay for it, would be considered insane, and if you bring this idea clearly to the mind of the patient he will be willing to pay you for the foundation upon which you are to erect your superstructure.

Dr. J. P. Root, Kansas City. Dr. Rhein in the course of his paper displayed very good sense, more sense than I gave him credit for, in relation to the crowning of live teeth. I think it is a positive crime to crown a live tooth.

As far as the radiographs are concerned I will admit I am ignorant of them, and theoretically they are undoubtedly a great thing, but Dr. Ottolengui made the remark that it is impossible for most of us to do that. In the first place the expense of it would bar most of us from using the radiograph in root canal treatment.

Root canal treatment does not bother me one single particle, and I do not think it need worry the rest of you. I go on the theory that God takes care of children, fools, drunkards and root canal fillers (laughter and applause). As I told you last night, I am a grandfather, so you see I am not a child; I know I am not a drunkard; I may be a fool, but the Lord does not have to take care of that in my case, so I know He devotes His interest in me to my root canal filling. I have had occasion in my college work to examine thousands and thousands of teeth. I have seen teeth from all over the United States treated in all manner of ways, and none of them were filled to the apex. I doubt if one per cent. of root



canals are filled to the end; it is the rare exception where they are, and you all know that practically in all cases we have no after trouble. If a man takes the proper precautions and fills his root canals properly, although he does not reach the end, I doubt if there will ever be very much trouble there.

There is another thing about the use of the radiograph. Dr. Rhein said he used it to find out whether he had reached the end of the canal; I doubt whether many of us would use it for that purpose very many times, and if we did, we never would dare show it to the patient (laughter and applause).

When Dr. Root says that a divine providence

Dr. M. L. Rhein. takes care of root fillers, I feel like getting serious.

Because you have put an imperfect filling in a root canal and the patient does not eventually complain, is no indication that the health of that patient is not being attacked by some form of what we vulgarly speak of as a blind chronic abscess, which is not manifesting any acute symptoms. That is the first point. The second point is this: I have many radiographs demonstrating that improper root canals have been in position for ten or fifteen years, with apparently no bad effects, when suddenly most acute inflammatory disturbances are set up, involving almost the life of the patient. We know too much of the serious results that come from conditions of this kind to permit me to be silent for a moment and allow such a remark to go uncriticized. That is one of the teachings of the dentistry of the future that there can be no question about—that we can not trust to blind root canal filling, and I claim that the medical profession, as well as the dental, have no idea of the malign influence on the health of people in general from imperfect root canal filling; troubles that they were not aware of, perhaps, until it was demonstrated in this way. I could stand here and talk until to-morrow morning of patients who had been cured of all kinds of difficulties due to the improper canal fillings that never gave the patient any trouble and that the patient never worried about because they were old chronic difficulties. We have heard from time immemorial of the dentist who tells his patient, "Oh, that's only a gum boil, don't worry about that," but we know that the patient is absorbing poison into his system, a poison that will break down the strongest constitution. I have just had brought to my attention the case of a lady, a leader in society, who was practically isolated from society for six months on account of dermatological reasons—skin trouble all over her body. She finally came into my hands, and the radiograph disclosed something like eight or ten blind abscesses, all chronic abscesses, some of them having little fistulæ, some of them not; and when the cure of these teeth was completed her physician came to me and told me that



SOCIETY DISCUSSIONS

my treatment was the treatment, and the only treatment, that could have cured the skin trouble from which this woman had been suffering. I simply cite this as one instance, and I can not speak too strongly against the acceptance of the view advanced by Dr. Root.

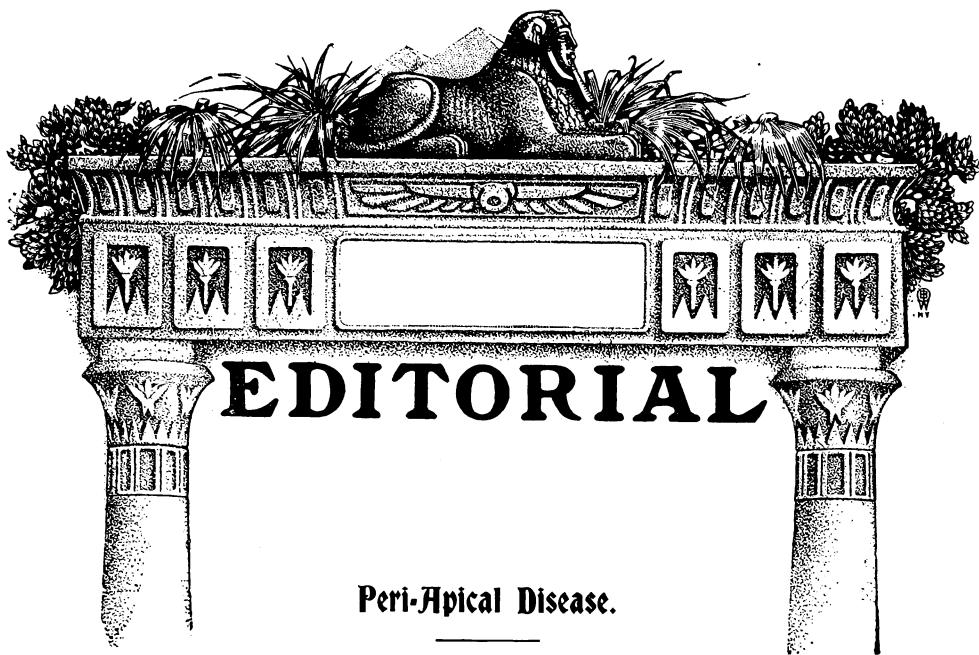
As to the country practitioner or the practitioner for the poor patient not being able to utilize X rays for work of this kind, I can only say this—it is far better, it is far safer, to go back to the extraction of teeth than to run the risk of imperfect root filling.

My remarks in regard to root canal filling were
Dr. Root. not made in the sense Dr. Rhein speaks of at all; I

am with Dr. Rhein in that; no matter how well we try, we will all sometimes fail, and I believe we should take every precaution to make a perfect root filling.

On motion adjourned until Friday, July 17, at ten A. M.





We have been endeavoring for ten years to obtain for our readers solutions of the many problems which are involved in the treatment of the several diseases which attack the pericemental membrane, and we feel particularly proud of the highly scientific articles which we have been enabled to present during the current year.

A notable classic, in this connection, was the splendid paper by Prof. I. Norman Broomell, in which he practically demonstrated that, at least during the formative periods, human teeth do not receive a blood supply through a single apical trunk vessel, as has been so often erroneously stated in articles, and even in text books.

Next we may allude to the remarkable series by Prof. John Bethune Stein, who has been thus far dealing with the subject almost from the point where Prof. Broomell closed. In wonderful serial sections of alveoli he conclusively proves that there is no definite canal from trunk vessel to apical foramen.

As many of our readers may not appreciate the work entailed in obtaining this data, it is pertinent to state that it required months of patient labor to cleanse the bones of animal matter in order to procure these

marvelous pictures, which present to us nothing but the bone itself, in many cases as fine as spun silk. By what has already been published, and with articles yet to follow, Prof. Stein will go far to elucidate the actual facts in relation to the nourishment of the pulp and pericementum, and it can be only upon final knowledge of this that any really scientific mode of treatment may be eventually based. Thus is the work of the practitioner absolutely dependent upon the researches of the scientist.

**Root-Canal
Treatment.**

But whatever the true secret of nourishment may be, we do know that a constant cause of periapical disease is infection from within the pulp canal, and whatever the final treatment may be, an imperative primary procedure must be the thorough cleansing of the pulp canal followed by sterilization of the canal and the dentinal tubuli.

The complete removal of canal contents has been the bugaboo of dentists since dentistry began. Perhaps no single operation has been more written upon, and yet with the hundreds of methods which have been described as adequate, even to-day, if a man dare say that he can reach the apices of even the majority of tooth roots, not a few of his hearers will believe that he is either self-deceived or else a wilful falsifier and a braggart. Yet certainly it is high time, for the honor of American dentistry, that this attitude should pass and that root canal treatment should be as skilfully and as successfully done as are other operations, for there is nothing in dental practice of so great importance. Of what advantage can it be to a patient for a practitioner to insert a perfectly matched porcelain inlay, or a perfectly occluded gold inlay, or a marvelously constructed bridge, if the canals of the supporting teeth have been inefficiently cleansed and filled?

"The operation was a success, but the patient died," is the sneer that is often cast upon the general surgeon. Is it any better to have it said of the dentist: "His bridge was splendid, but the roots abscessed!"

To the sceptics we are at last enabled to present convincing proof that root canals may often be filled thoroughly; yea, much oftener than is conceded to be possible by the majority. In the paper by Dr. M. L. Rhein we have this proof given to us with the aid of the X rays, and every one of our readers who is at all doubtful of the possibility of



cleansing canals thoroughly should read this carefully. We call attention especially to certain points.

In some of the illustrations are shown imperfect root canal fillings, and accompanying these are pictures of the same teeth thoroughly well filled. There would be no great moral in this were it not for the fact that the imperfect root fillings had been placed by men of acknowledged skill, not by tyros. These same men possess the skill to do better work, if they would only grasp the truth of the statement that roots can and should be filled better than they are filled by the vast majority of us to-day, and that carelessness in this department of our practice is a blot on our escutcheon.

Secondly, it is noteworthy that the X rays may be used not alone to discover how badly our brother has done his canal work, but we may also see how adequate or inadequate our own work may be. Thus in doubtful cases Dr. Rhein inserts a fine gold wire, makes a radiograph, and thus learns how nearly he has approached the apex. It is a common experience to meet great sensitiveness at the apical end of a tooth. The question arises: "Is the painful response due to a filament of pulp tissue still remaining, or does the broach pass through and puncture the pericementum?" An incorrect guess of the answer leads to imperfect root filling, and probably to peri-apical disease, as a consequence.

Again in Dr. Rhein's illustrations we may note the evils resulting from crowning roots which have been improperly filled.

Counting the Cost. Of course many will exclaim, "We can not afford an X ray outfit," or, "We can not add to our patient's expense the cost of having radiographs."

In some practices, of course, this may be true; indeed some unfortunates can not afford to have teeth filled at all. They are driven to frequent extractions, and finally to false teeth. But there are undoubtedly many practitioners who could and should afford to practice root canal work with the aid of the X rays, at least in many cases. For example, the man who would inadequately fill the roots of a molar because he can not afford to have a radiograph inform him of the incompleteness of his root filling, and who nevertheless would charge the patient one, two or three hundred dollars for the bridge, one end of



which rests on this tooth which is almost certainly doomed to disease, is improperly serving his patient, to use no harsher term.

At all events, whether the X rays become a constant adjunct to root canal work or not, Dr. Rhein has torn the veil from our eyes, and we can no longer say, "These things can not be," for at last it is demonstrated that perfect root canal work is nearly always possible, and that thorough dentinal sterilization will frequently save the root where the terminals can not absolutely be filled.

The Taggart Patents.

At the annual meeting of the New York Odontological Society, held January, 1907, Dr. William J. Taggart exhibited cast gold inlays, and a machine for making them.

Five hundred dentists stood up and cheered him. Everyone present seemed to think the process entirely new.

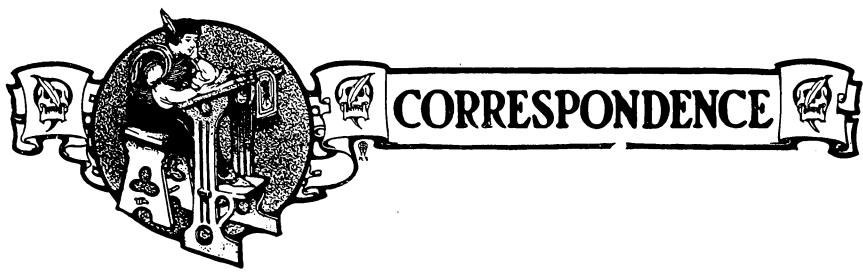
In September, 1908, a circular letter was mailed to several thousand dentists from Washington, D. C. This circular letter was signed by five prominent dentists of Washington, and solicited contributions of five dollars each to form a fund for defending Dr. Boynton, a dentist sued by Dr. Taggart for infringing his patents. The Washington Committee seem to think that Dr. Taggart's process is old.

On October 12th, 1908, The Second District Dental Society of New York discussed this subject, and voted to support Dr. Taggart.

On October 20th, 1908, The New York Odontological, by unanimous vote, passed a resolution expressing confidence in Dr. Taggart.

As we go to press, we have received copy of a circular letter from Chicago, signed by twenty-five prominent dentists of that city, declaring confidence in Dr. Taggart and assuring the profession that Dr. Taggart will not use his patents to harass his brother practitioners.

Thus we find the dentists of the country lining up in two camps; those who are willing to pay Dr. Taggart for his great invention, and those who wish to use it free.



The Problem of Reorganizing the National Dental Association.

In order to obtain an expression of opinion in regard to the proposed reorganization of the National Dental Association, the following circular letter was sent to all the members thereof:

NEW YORK, September 30, 1908.

MY DEAR DOCTOR:

You are a member of the National Dental Association. You are, therefore, interested in its future, or at least you should be. A crisis has arrived in its affairs. There has been increasing dissatisfaction with the present constitution which has culminated in a recommendation at Boston by the retiring president, Dr. Carr, that a committee be appointed to revise the constitution.

Prior to the Boston meeting I had the honor of giving this subject a great deal of study, and I spent considerable time investigating the effect which has been produced upon the American Medical Association by the adoption of its present constitution. I find that within less than ten years the present method of organization has lifted the medical profession, from a condition very similar to ours, into a vast, powerful, homogeneous and successful professional association. The American Medical Association at present manages a journal, owns its own printing and engraving plant, and has a bank balance which runs into the thousands, with property assets many times larger than its cash balance.

Believing that a similar state of affairs can be brought about in dentistry, I had the honor of compiling a constitution and by-laws similar to that of the American Medical Association, but with such alterations as seemed necessary to fit the present condition of affairs in dentistry. This constitution I presented at Boston and asked that it be referred to the Committee for Revising the Constitution. This constitution and by-laws were published in the September number of *ITEMS OF INTEREST*, and I am addressing this letter to the members of the National Dental Association with a hope of receiving replies which will give a real expression of opinion from all the members. This can be done in no other way because we never have all of our members at any one meeting. I believe that the present committee would be very glad to know just how the



majority of the members of the National feel about revising the constitution. I request, therefore, that you will first read over the constitution as published in the ITEMS OF INTEREST for September, and having done so, that you will at least write me a note saying that you approve or disapprove of such a reorganization. Your replies will be considered confidential in case you so request, except that I will report them to the Committee on Revision, but I should also be glad to have your permission to publish the result of this canvass in the magazine. I would also be glad to publish any criticism that you might make, whether favorable or unfavorable, because, my dear Doctor, I am endeavoring merely to discover what is best for our national body, and to learn just what the majority of our members think would be the best means to this end.

Hoping for an early reply, Fraternally yours,

R. OTTOLENGUI.

We have thus far received only a few replies, but these are quite significant. The delay in answering is probably due to the fact that the constitution itself is quite lengthy and the members are taking time to study it. We sincerely hope, however, that every man in the organization who is interested in its welfare will be willing to place himself on record in this matter, as such an expression of opinion will undoubtedly be of great assistance to the committee in charge of the revision.

The following are the replies which have been received to date:

DEAR DOCTOR:

I have your letter of September 30.

I will say in reply that at present I do not think anything in the form of a constitution will help matters in the National Dental Association. There are other things that must be remedied, and I doubt very much if in the present body, as it meets and discusses matters, is the place to undertake the remedy. It should come originally from State organizations, and will have to do so before the remedy becomes effective. We, as you know, have been at work on that subject in this State, and it is hardly worth while to hurry the matter before it is ready, in the National Association, for if we do it won't work.

I have been a pretty close student of the doings of the association for a good many years, and it is a study of men that we want, more than of constitutions. I tried myself upon what I thought a better constitution, which was finally adopted, but it is of no value whatever in correcting the errors that have crept into the association. Sometime I will try to discuss this feature more fully.

Very truly,

G. V. BLACK.



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DEAR DOCTOR:

Your letter of September 30 came duly to hand. I have read the proposed change in the constitution as prepared by you and published in the ITEMS OF INTEREST for September last. I am in hearty accord with the movement which is being made to change the constitution of the National Dental Association, and it seems to me that the one you propose embodies all that is good in a constitution. Personally I have had no intimate knowledge of the working of a similar one in the American Medical Association, but I have learned through my medical friends and others that their association has been most prosperous under it. I have felt for a long time that ours needs revision, and I am glad that an effort is being made now to do it.

Wishing you success in the enterprise, I am,

Sincerely yours,

Philadelphia, Pa.

EDWIN T. DARBY.

DEAR DOCTOR:

I am in receipt of your circular letter relative to the proposed constitution and by-laws you have offered for the reorganization of the National Association, and inviting a free and dignified discussion of same.

Because of the fact that the delegates to the National from the Alabama Association are not elected as provided by the constitution of the former association, I did not avail myself of the opportunity to attend the sessions of this association until its meeting in Atlanta in 1906. At this meeting it soon became apparent to my mind that there was a spirit of dissension rife among the members, and that an open rupture was narrowly averted. It is not worth while to discuss the cause of this trouble, but suffice it to say I became thoroughly convinced that something was radically wrong with the basic principles upon which the organization was founded, and that a change in constitution was absolutely essential to its perpetuation. A real syntaxis of the component parts of the Association did not exist, which occasioned friction, discontent and questionable efficiency in fulfilling the purposes for which it was intended.

That I may be clearly understood concerning the election of delegates from my State association, let me say that each year the secretary is instructed to issue credentials to members in good standing who may apply for same, in the order in which they are received. As a consequence, many do not consider it very much of an honor to elect themselves to represent their State Association.

I have discussed the relationship existing between the Southern Branch and the National Association with several of our older and most prominent members, and I am of the opinion that opposition will be in-



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curred against reorganization of the National Association should the existing privileges of the members of the Southern Branch be constitutionally abridged. The older members of the Southern Branch are proud of the history of their association, and look upon it as one of the parents of the National. They are, therefore, loathe to make further concessions to the National Association than were made at the time of its organization.

Personally, I am with you heart and soul in any movement that will effectually build up the National Association, and which will give it that dignity and high position it deserves and should possess. Until we accomplish such a result, we can not expect the profession of this and foreign countries to view it with that respect to which it is entitled as the highest and most representative fraternal and scientific organization of dental surgeons in this great country.

I am very much in favor of the suggestion made by some one, that the office of president of the association be strictly an honorary one, and be given to such members of the association who have gained distinction either in some special scientific endeavor or professional attainments, and that the active management of the deliberations of the general sessions or of the House of Delegates be intrusted to some one of known executive ability. The success of any meeting depends more on the latter qualification than upon anything else. The fact that John Doe, D.D.S., M.D., Ph.D., LL.D., F.R.S., etc., is president of the association will do more harm than good unless that learned gentlemen can decide quickly and accurately on rules of order, can maintain his equilibrium during heated discussions and cross-firing for parliamentary advantage, and otherwise expedite matters by firm and unbiased decisions based upon an intimate and an accurate knowledge of rules governing deliberate bodies.

I should also like to see provision made for a special fund to be used in remunerating members who are qualified and inclined to devote their time to special experimental and research work for the benefit of the profession at large. If such a fund had been created years ago, I have no doubt but that we would not be paying to-day four dollars per bottle for silicate cements, and unreasonable prices for certain instruments and laboratory equipments.

The very small number of dental surgeons who belong to the National Association is itself sufficient evidence of the fact that the association can not prosper under present conditions.

On every other point I believe I am now in hearty accord with the proposed new constitution, unless it is the admission, without having to pay dues, of members of the Army and Navy Corps of Dental Surgeons. I do not now understand why this distinction should be made. Of course the price of the journal of the association may be as much as the dues,



as it is in the American Medical Association. This, then, would be only a nice way of showing a courtesy and afterward making them pay for having received it, provided they cared to subscribe to the journal. And, of course, it would be very discourteous for them not to do so after being so courteously treated by the association.

Brewton, Ala.

Fraternally yours,

W.M. A. LOVETT.

MY DEAR DOCTOR:

Your letter asking about a change in the constitution of the National Dental Association received. I agree with you *absolutely*. I am in favor of the change in the constitution and by-laws as suggested by you.

New York, N. Y.

Yours very truly,

W. W. WALKER.

DEAR DOCTOR:

Yours of the 30th to hand, and I heartily approve of your proposed constitution and by-laws for the National Dental Association. The only criticism I have to offer is in regard to the grouping of subjects in the various sections, and that you did not accurately name the Institute of Dental Pedagogics. I earnestly hope that you will succeed in your efforts because the need of it has been apparent for years.

St. Louis, Mo.

Sincerely yours,

B. E. LISCHER.

DEAR DOCTOR:

Your letter of September 3d received. Have read your proposed constitution, and think it is a good one, especially as to the House of Delegates. I believe this will, to a great extent, do away with politics in the association, which has proved objectionable. Have not found anything but what seems for the good of all. Therefore no criticisms.

Pensacola, Fla.

Sincerely,

C. L. SMITH.

DEAR DOCTOR:

In answer to the circular letter which has reached me this day I desire to say that for a number of years I have been one of the men who has worked very hard, very much, and often very long, for the success of the meetings of the N. D. A.



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If by adopting a new constitution it will in any way tend to interest more men in the advance and progress of the dental profession, by all means let us have it.

As I view this subject, from the experience which has been gained in the past, a new constitution will not make men any more willing to work than they ever have been. There are only a few workers—far too few—in any society, and the few willing ones must do the work or else it will never be done. I do not know what influence a new constitution will have on this condition of affairs.

If the members of the N. D. A. wish a new constitution, by all means have it, but in planning it, for goodness sake remember and take advantage of past mistakes, and, in so far as possible, adopt one this time which will last for a few years. And while doing it, kindly remember that, on page 20, Transactions of the N. D. A. for 1905 and 1904, is a suggestion which I made, that I still feel is worthy of some consideration.

E. K. WEDELSTAEDT.

St. Paul, Minn.

DEAR DOCTOR:

Responding to your circular letter anent the proposed new constitution, I would say I think the name should be more distinctive; therefore it should be the United States National Dental Association, or the National Dental Association of the United States. It would by word of mouth be called the "National," but officially it would then be distinctively known as that of the United States. I think it would be best to change the word "unanimous" in Article VIII., Annual Sessions, to "two-thirds" or "three-fourths," for a clique of two or more would thus be prevented from frustrating a worthy procedure. Section 2 of Book III., "Vice-presidents," should be so amended as to determine without doubt who is the "ranking vice-president." Section 4 of the same book should be amended so as to allow pecuniary compensation to the recording secretary for his heavy and fatiguing work. These are my humble opinions.

Yours truly,

Aiken, S. C.

B. H. TEAGUE.

DEAR DOCTOR:

By all means the N. D. A. should be reorganized. The N. D. A. and the dental profession will never amount to anything while the N. D. A. is run on the old constitution and by-laws.

Yours truly,

Camden, N. J.

A. IRWIN.



DEAR DOCTOR:

I have yours of September 30th. I certainly approve of the re-organization. I have for a long time been of the opinion that we should organize along the lines of the American Medical Association. I was much disappointed when the American and Southern came together that the plan was not adopted. To my mind the proposed change is the only way in which a great association and journal can be founded.

Fraternally yours,

Pittsburg, Pa.

W. H. FUNDENBERG.

DEAR DOCTOR:

I am in favor of the change of the constitution of the National Dental Association as published by you in the September number of the ITEMS OF INTEREST.

Fraternally yours,

Fort Wayne, Ind.

W. W. SHRYOCK.

DEAR DOCTOR:

I have read carefully the proposed constitution and by-laws for the National Dental Association, and I believe it a long step in the right direction. So far as I can see now I have no criticism to offer. It certainly has a great advantage in having been tried out by the American Medical Association.

Fraternally yours,

Hudson, N. Y.

CHAS. K. VAN VLECK.

My DEAR DOCTOR:

I have read your proposed constitution for the reorganization of the N. D. A., and am in receipt of your circular letter to the members of that organization. I can only say Amen! to all of it. It is in direct accord with what I have been writing and talking in dental societies for the past four years. The last utterance of this nature was made by me at the fiftieth celebration of the Indiana State Society, at Indianapolis—publication of which appears in the "Summary." With your plan in full operation the N. D. A. becomes a truly representative vital organization calculated to do as effective work for dentistry as the present American Medical Association is for medicine. Of course, Illinois to a man will back you in this work.

Truly yours,

Chicago, Ill.

C. E. BENTLEY.



MY DEAR DOCTOR:

Replying to your circular letter dated September 30th, I read the proposed new constitution and by-laws published in ITEMS OF INTEREST, and am interested.

I do not feel competent myself at this writing to give an opinion that should have any weight with the committee further than to say, I believe that *something* should be done. To my mind one thing is evident, there is so great a difference between organized dentistry and the medical fraternity that we can not feel altogether sure that the constitution of the latter named profession would furnish a safe working basis for our reorganization.

If the committee is representative, why not let it investigate and report without manufacturing sentiment that, while hardly the most trustworthy, might be prejudicial.

Very sincerely yours,

Buffalo, N. Y.

FRANK W. LOW.

DEAR DOCTOR:

Dr. Low has so well expressed my sentiments that to save time I will indorse them in toto.

Very truly yours,

Buffalo, N. Y.

J. W. BEACH.

DEAR DOCTOR:

In response to your circular letter, please record me as being in favor of the proposed new constitution.

Sincerely yours,

New York, N. Y.

JOHN NUTTING FARRAR.

DEAR DOCTOR:

In reply to yours of September 30 I beg to say that I have read the proposed constitution and by-laws, and approve of the general plan; in fact am very glad to see such a change proposed in the plan of the National Association.

In regard to suggestions, I have this to offer. I see no provision as to the manner of payment of dues. I would suggest that it be made through the constituent societies, and that again through the local constituent societies. This would do away with the annoyance to the members of sending dues to the three societies, and would tend to bring the working of the constituent societies more in harmony with the National

Yours truly,

Sheboygan, Wis.

J. S. DANFORTH.



Protection of Pulps under Gold Inlays.

Editor ITEMS OF INTEREST.

Dear Sir—It is indeed with the deepest interest that we read in the August issue of Vol. XXX, ITEMS OF INTEREST, a communication from Dr. H. T. Smith, of Cincinnati, cautioning the dental profession of the dangers in the majority of large Taggart gold inlay fillings in close approximation to the vital pulp of causing pulpitis by thermal shock. Evidently Dr. Smith has experienced the same trouble that I have in the cases he so ably refers to.

I shall endeavor to be able in this communication through your valuable journal to suggest a simple system to overcome these embarrassing cases. This method has been suggested to others and they report uniform success. It is practical in porcelain or gold inlays; in vital or devitalized teeth. However, I shall dwell upon the Taggart cast gold inlay in vital teeth. I have used it for the past eight months successfully. In all deep cavities where cast gold inlay is practical, use it. Prepare the cavity in the usual way except to bevel angle of enamel surfaces outward to give outer edge of inlay a more firm seating, independent of cement, as explained more fully later. Now fill the cavity to about one-sixteenth of an inch from the line of the enamel and dentin with gutta percha (temporary stopping) or dental-lac; my preference is the stopping, as the surfaces can be etched, making a roughened surface on the cement side for a more firm adherence; trim the gutta percha smooth at the edges, take usual wax impression over the gutta percha, cast the inlay, then entirely remove the percha, fill cavity with cement, place inlay and drive home and remove excess as usual.

Any one can readily realize the principles and advantages of the hollow inlay over the unwieldy mass of gold.

First.—The bur can be passed around the bevel edge, thus loosening the filling easily, and the bevel gives better seating strength and is less liable to leak.

Second—It is a saving of labor, gold and pain.

Third—The pulp in a vital tooth is perfectly insulated, and more strength is given to a devitalized tooth.

Fourth—The filling has a far better adaptation than a large mass.

In sensitive cavities (extreme cases), I use Gilbert's varnish over pulp wall only. I disagree with Dr. Smith as to using varnish plentifully, as cement will not satisfactorily adhere to varnished surfaces, and that is our chief means for retaining inlays.



It seems to me that it is entirely unnecessary to cast a large mass of gold to fill out a cavity successfully. Dr. Taggart will no doubt agree with this argument. Why must a large solid mass of conductive metal be used, when an ordinary gold crown made from 28 to 32 gauge wears for years with good results?

I think it is good ethics and technique to have an insulating mass of cement under a gold inlay, rather than a large mass of gold, either in vital or devitalized teeth, large cavities especially.

I do not think carving the wax model or impression a good idea, for we are too apt to change the form of model before investing and have a faulty filling. Carving is not necessary when you build over the gutta percha.

W. G. Hamm, D.D.S.

Chillicothe, Ohio.

Proportions of the Normal Dental Arches (Temporary and Permanent).

Editor ITEMS OF INTEREST.

Dear Sir—The British Society for the Study of Orthodontia has appointed a committee to ascertain what work has been done up to the present by way of ascertaining the proportions of the different types of normal dental arches, and applying this knowledge to the treatment of actual cases in practice. It is thought that just as human skulls are classified according to the cephalic index which is based on the measurements of length and breadth, so the study of dental arches based also on anthropological methods might be of great service as a basis for the more serious study of orthodontia. The society is, therefore, anxious to ascertain whether any measurements of normal arches have been made with this object in view, and will be grateful for any references to papers which have been published on the subject in any language, or for the names of any who have been occupied in a research of this kind.

The committee would indicate the following as the points upon which they will be glad to have any specific information or statistics, either regarding the temporary or permanent arches:

1. Relation of length of arch to breadth: What were the methods of measurement, and what points were taken to measure between?
2. Relation of size of teeth to size of arch: What method of determining this correlation was adopted?
3. Height of palate: Points of measurement used to determine this?



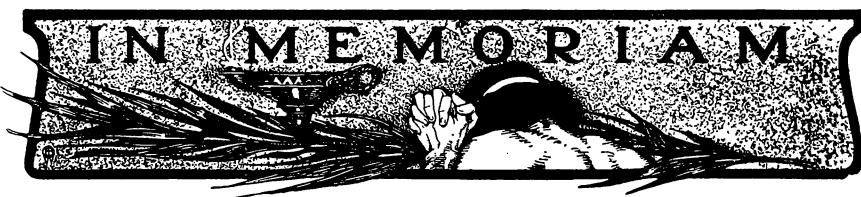
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Any information bearing on this subject, or reference to papers, will be gratefully received by—

G. G. CAMPION,
264 Oxford Road, Manchester.

H. CHAPMAN,
20 Queen Anne Street, London, W.

J. E. SPILLER,
62 Worple Road, Wimbledon.



Dr. J. H. P. Benson.

At a special meeting of the District of Columbia Dental Society, held October 7, 1908, the following resolutions were adopted:

WHEREAS, This society has heard with feelings of sincere sorrow of the death of one of its most cherished members—Dr. J. H. P. Benson, it is,

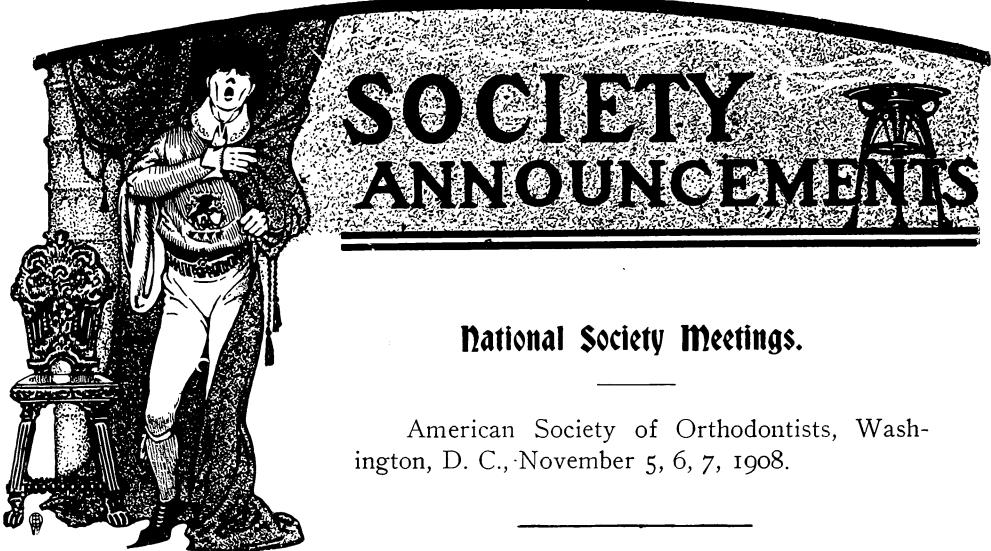
Resolved, That in the death of Dr. Benson this society has lost one of its most valued members—a man of sterling integrity, unswerving loyalty and an always sympathetic friend—a man who so fearlessly performed every duty to his profession and to this society that he had won his way to a very honorable standing among those with whom he associated.

Resolved, That in the death of Dr. Benson the profession of dental surgery has lost one of its most valued members, who in a modest but forceful way contributed much to the uplift of his profession, by his methods of practice and by his equipment as a teacher of many years' experience.

Resolved, That this society extend to his bereaved family its sincere sympathy, and that a copy of these resolutions be forwarded to his widow and that copies be sent to the dental journals.

Resolved, That this society attend the funeral in a body.

H. C. THOMPSON,
C. W. SCOTT,
H. J. ALLEN.



SOCIETY ANNOUNCEMENTS

National Society Meetings.

American Society of Orthodontists, Washington, D. C., November 5, 6, 7, 1908.

Connecticut State Dental Commissioners.

The dental commissioners of the State of Connecticut hereby give notice that they will meet at Hartford, on Wednesday, Thursday and Friday, November 11, 12 and 13, to examine applicants for license to practice dentistry, and for the transaction of any other business proper to come before them.

On receipt of application blank, filled in and sworn to, and accompanied with fee of twenty-five dollars (\$25.00), each applicant will be sent a number, which number will represent said applicant during the examination.

The practical examination will take place at Putnam Phalanx Armory, corner Haynes and Pearl Streets, on Wednesday, November 11. All prosthetic pieces should be tagged with applicant's number and handed to commissioners at 9 o'clock, Wednesday morning. Applicants whose numbers range from one to sixteen, inclusive, will be examined in operative dentistry at 10 A. M. Those whose numbers are above sixteen will be examined in operative dentistry at 2 P. M. All applicants whose credentials are accepted shall be entitled to take both the practical and the theoretical examinations. Credentials shall be examined at the Hotel Heublein, Tuesday evening, at 8.30; and at Putnam Phalanx Armory at 9 o'clock, Wednesday morning.



On Thursday, November 12, the theoretical examination will be held from 9.00 to 11.00, 11.30 to 1.30 and 3.30 to 5.30. On Friday, November 13, from 9.00 to 11.00 and 11.30 to 1.30. Theoretical examination will be held at the State Capitol.

By order of the commission.

GILBERT M. GRISWOLD, Recorder.

783 Main Street, Hartford, Conn.

National Association of Dental Examiners.

At the meeting of the National Association of Dental Examiners, held at Back Bay, Boston, Mass., July 24, 25, 27, 1908, the following officers and committees were elected:

President, F. A. Shotwell, D.D.S., Rogersville, Tenn. Vice-presidents: For the South, J. R. Wallace, D.D.S., Louisville, Ky.; for the East, A. L. Midgley, D.D.S., Providence, R. I.; for the West, J. J. Wright, D.D.S., Milwaukee, Wis. Secretary and treasurer, Charles A. Meeker, D.D.S., 29 Fulton Street, Newark, N. J.

Committee on Colleges: James G. Reid, D.D.S., chairman, 1204 Trude Building, Chicago, Ill.; J. A. Hall, D.D.S., Birmingham, Ala.; Starr Parsons, D.D.S., Washington, D. C.

Tabulating Committee: Alphonso Irwin, D.D.S., chairman, Camden, N. J.; S. C. Rubey, D.D.S., Clinton, Me.; C. P. Pruyn, D.D.S., Chicago, Ill.

Joint Tabulating Committee of the N. A. D. E. and N. A. D. F.: John F. Dowsley, D.D.S., chairman, 175 Tremont Street, Boston, Mass.; Alphonso Irwin, D.D.S., Camden, N. J.; James G. Reid, L.D.S., Chicago, Ill.

H. E. Friessell, D.D.S., chairman, Pittsburg, Pa.; R. M. Sanger, D.D.S., East Orange, N. J.; J. H. Kennerly, D.D.S., St. Louis, Mo.

Joint Conference Committee of the N. A. D. E. and N. A. D. F.: George E. Mitchell, D.D.S., chairman, Haverhill, Mass.; J. A. Hall, D.D.S., North Birmingham, Ala.; Frank O. Hetrick, D.D.S., Ottawa, Kan.

H. E. Friessell, D.D.S., Pittsburg, Pa.; R. M. Sanger, D.D.S., East Orange, N. J.; J. H. Kennerly, D.D.S., St. Louis, Mo.



Publication Committee: J. E. Chase, D.D.S., chairman, Ocala, Fla.; G. L. Todd, D.D.S., Lake City, Minn.; W. H. de Ford, D.D.S., Des Moines, Iowa.

Committee on Credentials: F. C. Walker, D.D.S., chairman, Brooklyn, N. Y.; G. M. Griswold, D.D.S., Hartford, Conn.; J. B. Stiff, D.D.S., Fredericksburg, Va.

Committee for Promoting a System of Uniform Examinations: T. F. Turner, D.D.S., chairman, 721 Olive Street, St. Louis, Mo.; G. C. Marlow, D.D.S., Lancaster, Wis.; H. C. Brown, D.D.S., Columbus, Ohio.

Committee on Contracts and Accommodations: Charles A. Meeker, D.D.S., Newark, N. J.

Committee on Resolutions: Forrest G. Eddy, D.D.S., chairman, Providence, R. I.; H. B. McFadden, D.D.S., Philadelphia; O. H. Simpson, D.D.S., Dodge City, Kan.

Delegates must send credentials signed by the president and secretary of their respective boards ten days previous to the annual meeting, to the general secretary.

Seventh and Eighth District Dental Societies.

There will be a union meeting of the Seventh and Eighth District Dental Societies at the Hotel Seneca, Rochester, N. Y., on November 12, 13 and 14.

CLINT W. LASALLE, Secretary.

Ohio State Dental Society.

The forty-third annual meeting of the Ohio State Dental Society will convene in Columbus, on December 1, 2 and 3, 1908, at the assembly rooms of the Great Southern Hotel.

The programme of essays and clinics will be such as to afford instruction to all in the various phases of present-day practice.

Make your arrangements now to be present. Come and enjoy the benefits to be derived and renew old friendships.

F. R. CHAPMAN, Secretary.

305 Schultz Building, Columbus, Ohio.



Iowa Board of Dental Examiners.

The Iowa State Board of Dental Examiners will hold its next examination at Iowa City, December 1, beginning at 9.00 A. M.

Practical examination in operative and prosthetic dentistry. All fees must be in the hands of the secretary by November 15.

E. D. BROWER, Secretary.

Le Mars, Iowa.

Wisconsin State Dental Society.

The Wisconsin State Dental Society held its annual meeting July 21, 22, 23, 1908, at La Crosse, Wis. The convention was one of the most profitable and enjoyable in its history. The society was reorganized and the following officers elected:

President, W. H. Mueller, Madison, Wis.; first vice-president, G. F. Hauser, La Crosse, Wis.; second vice-president, E. A. Geilfuss, Goldsmith Building, Milwaukee, Wis.; secretary, Harvey N. Jackson, Wells Building, Milwaukee, Wis.; treasurer, Adolph Gropper, Goldsmith Building, Milwaukee, Wis.; librarian, H. G. Morton, Mack Block, Milwaukee, Wis.

Executive Council: W. H. Mueller, Madison, Wis.; Harvey N. Jackson, Milwaukee, Wis.; Adolph Gropper, Milwaukee, Wis.; A. J. Du Bois, Neenah, Wis.; Geo. C. Marlow, Lancaster, Wis.; E. C. Oviatt, Columbus, Wis.; E. C. Smith, Eau Claire, Wis.; W. C. Wendel, Milwaukee, Wis.; T. A. Hardgrove, Fond du Lac, Wis.; Charles Southwell, Milwaukee, Wis.; E. A. Gatterdam, La Crosse, Wis.; W. A. Gamble, Fox Lake, Wis.

Programme: Chas. L. Babcock, Colby & Abbott Building, Milwaukee, Wis.

Clinic: Chas. Southwell, Goldsmith Building, Milwaukee, Wis.

Local Arrangements: E. A. Geilfuss, Milwaukee; A. A. Jennings, Milwaukee; Geo. P. Brenner, Milwaukee.

Science and Literature: Arthur Holbrook, Milwaukee.

Art and Invention: F. S. Robinson, Chippewa Falls, Wis.

Publication: R. R. Powell, Janesville, Wis.; M. L. Christensen, Oshkosh, Wis.; Harvey N. Jackson, Milwaukee, Wis.

Board of Censors: F. G. Van Stratum, Hurley, Wis.; Franklin R. Houston, Green Bay, Wis.; B. C. Campbell, Lake Geneva, Wis.

Infraction of Code of Ethics: J. L. Malone, Superior, Wis.; E. J. Hart, Madison, Wis.; C. T. Rodolf, Muscoda.